ILLINOIS

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

PRODUCTION NOTE

University of Illinois at
Urbana-Champaign Library
Large-scale Digitization Project, 2007.

ILLINOIS NATURAL HISTORY SURVEY

A Survey of Sport Fishing in the Illinois Portion of Lake Michigan

F-52-R7

Annual Report
to
Illinois Department of Conservation

Center for Aquatic Ecology

Wayne A. Brofka and J. Ellen Marsden
Illinois Natural History Survey
Lake Michigan Biological Station
400 17th Street
Zion, Illinois 60099

May 1993

Aquatic Ecology Technical Report 93/4

A SURVEY OF SPORT FISHING IN THE ILLINOIS PORTION OF LAKE MICHIGAN

April through September, 1992

Wayne A. Brofka and J. Ellen Marsden

Lake Michigan Biological Station
Center for Aquatic Ecology, Illinois Natural History Survey

Submitted to
Division of Fisheries, Illinois Department of Conservation
in fulfillment of the reporting requirements of
Federal Aid Project F-52-R7

J. Ellen Marsden
Principal Investigator

David Philipp, Head
Center for Aquatic Ecology

Steven L. Kohler
Acting Center Director

May 1993

This study was conducted under a memorandum of understanding between the Illinois Department of Conservation and the Board of Trustees of the University of Illinois. The research was performed by the Illinois Natural History Survey, a division of the Illinois Department of Energy and Natural Resources. The project was supported by funds made available through the Federal Aid in Sport Fish Restoration Act and administered by the Illinois Department of Conservation. The form and content of this report and the interpretations of the data are the responsibility of the Illinois Natural History Survey and the University of Illinois and not the Illinois Department of Conservation

ABSTRACT

A survey of sport fishing in the Illinois portion of Lake Michigan was conducted from April 1 to September 30, 1992. The survey covered all legal sport fishing during that period except fishing from chartered boats and smelt fishing. It included angling by pedestrians and fishing from boats. The intent of the survey was to provide reliable estimates of sport fishing activity, sport fish harvest, expenditures for sport fishing, and quality of sport fishing. Estimated total fishing effort for pedestrians and boaters was 1.13 million angler-hours. Estimated total harvest included 1,066,000 yellow perch, 4,500 brown trout, 5,400 rainbow trout, 5,400 lake trout, 56,000 coho salmon, and 8,000 chinook salmon. Estimated expenditures for boats, motors, trailers, fishing gear, and automobile gas were $8.6 million. The yield value of the sport fishing harvest was approximately $2.7 million.

One additional special survey was conducted. From October 1 to November 15, 1992, a survey of snagging was conducted. Snaggers using the four legal snagging areas fished for 15,400 hours, catching 1,000 chinook salmon, 150 coho salmon and insignificant numbers of other species.

INTRODUCTION

This report summarizes a survey of sport fishing in the Illinois portion of Lake Michigan from April 1 to September 30, 1992. The survey covered all types of legal sport fishing during that period, with the exceptions of charter-boat fishing and smelt fishing. In addition, a supplemental survey was conducted: A survey of snagging was conducted from October 1 to November 15. That survey is reported in Appendix C. The intent of the project was to provide reliable estimates of sport fishing activity, sport fish harvest, expenditures for sport fishing, and quality of sport fishing. Results from the first six years of this series of annual surveys were reported elsewhere (Horns and Gorden 1986, Horns and Gorden 1988, Horns 1988, Horns 1989, Horns and Brofka 1990, Horns and Brofka 1991, Horns and Brofka 1992). The most recent preceding creel survey of this type in Illinois was conducted in 1979 by Bruce Muench (Muench 1981).

Geographic Setting

The geographic setting of this survey is illustrated in Figure 1. The area under the jurisdiction of Illinois includes 63 miles of Lake Michigan shoreline. This area is highly developed and heavily industrialized. Chicago covers roughly one-third of the shoreline, and a series of smaller cities cover almost all of the remainder. This section of Lake Michigan lacks significant tributary streams. A geographic feature that influences the distribution and success of sport fishing is the slope of the near-shore lake bottom; the slope becomes progressively steeper as one moves from south to north. This progression means, for example, that boaters from Chicago must go considerably farther from shore to reach good salmon waters than boaters departing from Winthrop Harbor.

Distribution of Fishing

Pedestrians and launched boats

The survey recognized 27 fishing areas (Table 1). Helicopter flights in 1985-90 and 1992 were used to determine the distribution of fishing. The 27 areas accounted for 92% of the pedestrian anglers observed in the aerial surveys and 100% of the boat trailers parked near launch areas. Boats launched from the Calumet Yacht Club (25 to 50 launches per week in mid summer) were not included in this survey. In this survey interviews were conducted at eight pedestrian fishing areas and four launch areas. The pedestrian areas (Waukegan Power Plant, Waukegan Harbor, Montrose Harbor, Diversey Harbor, Burnham Harbor, McCormick Place, Jackson Park, and Calumet Park) accounted for 73.1% of the pedestrian anglers observed during the helicopter flights. The four launch areas (North Point Marina, Diversey Harbor, Burnham Harbor east ramp, and Calumet Park) accounted for 55% of the boat trailers observed near launch areas. In 1990-92, launches from the newly-opened North Point Marina accounted for a substantial fraction of all launches.

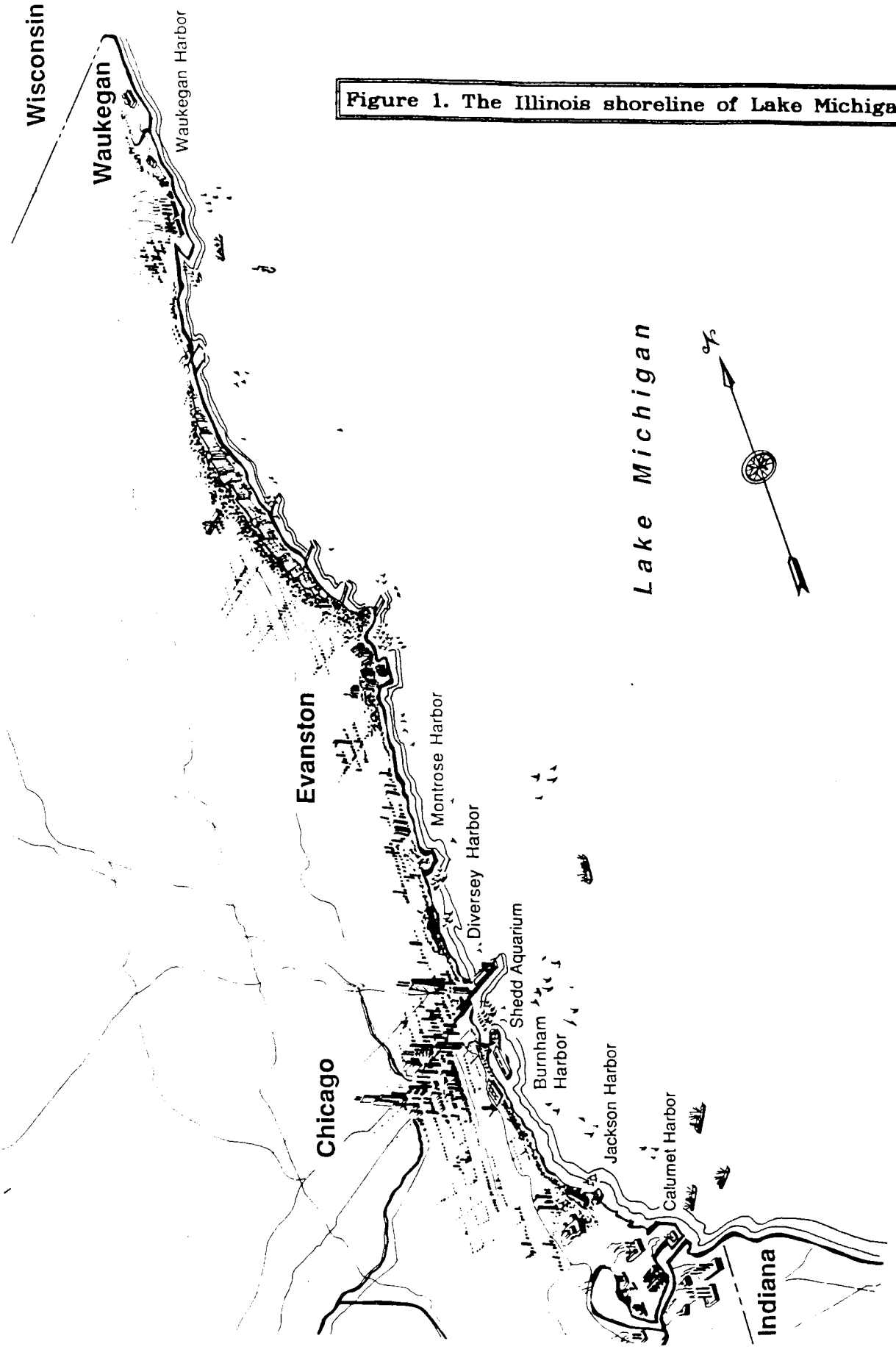


Figure 1. The Illinois shoreline of Lake Michigan.

Table 1. Distribution of pedestrian anglers and boat trailers (1992).

Area	Pedestrian Anglers (%)	Boat Trailers (%)
1. Ill. Beach State Pk & (North Pt. Marina)	0.2	30.2
2. Waukegan Power Plant discharge and pier	0.0	0.0
3. Waukegan Harbor and breakwalls	17.5	20.1
4. Great Lakes Naval Training Station	2.0	2.3
5. Forest Park	0.0	2.3
6. Central Park	0.0	1.6
7. Winnetka (Lloyd and Tower Parks)	0.2	0.6
8. Wilmette Harbor	0.3	0.0
9. Northwestern Univ. and Dawes Park	0.8	6.0
10. Farwell Avenue pier	0.8	0.0
11. Hollywood Avenue pier	0.8	0.0
12. Foster Avenue pier	0.3	0.0
13. Wilson Avenue ramp	0.0	0.3
14. Montrose Harbor and breakwalls	37.3	0.0
15. Belmont Harbor	4.8	0.0
16. Diversey Harbor and breakwalls	3.2	8.3
17. North Avenue pier	0.1	0.0
18. Navy Pier	3.1	0.0
19. Monroe Street breakwalls	2.2	0.0
20. Burnham Harbor and vicinity	6.7	(E) 2.9 (W) 11.9
21. McCormick Place seawall	2.3	0.0
22. 31st Street pier	1.9	0.0
23. 50th Street access area	0.2	0.0
24. 59th Street Harbor	0.9	0.0
25. Jackson Park Harbor and breakwall	4.0	0.1
26. Rainbow Park	0.7	0.0
27. Calumet Park	2.1	13.7
28. other areas	7.7	0.0

Moored boats

The principal boat mooring areas are North Point Marina, Waukegan Harbor, Great Lakes Naval Training Station, Wilmette Harbor, and the Chicago Park District harbors. This survey did not include boats kept at moorings or on land in the Calumet or Chicago river systems. In this survey we used the numbers of power boats kept at moorings as an index of fishing activity from moored non-charter power boats. Table 2 summarizes the distribution of moored power boats. Although some fishing occurs from sail boats, we assumed that it was a negligible portion of all fishing. The only private lift service that we included in the survey was that of Larsen Marine (referred to as I/O service in Table 2), which operates in Waukegan Harbor.

Table 2. Distribution of moored non-charter power boats.

Mooring area	Number of power boats
North Point Marina	797
Waukegan Harbor	597
Public Moorings	477
Larsen Marine I/O service	120
Great Lakes Naval Training Station	96
Wilmette Harbor	85
Chicago Park District:	
Diversey	690
Burnham	502
other harbor moorings	768

METHODS

The following groups were considered separately: (1) Pedestrian and launched-boat anglers. These anglers could be studied directly through personal interviews and direct head counts conducted between 1 April and 30 September. (2) Anglers using moored boats. The data presented here are based entirely on extrapolations from estimates for anglers using launched boats.

Pedestrians and Launched-boat Anglers

Estimates were made for selected primary fishing areas, and those estimates were extrapolated to less heavily fished areas. For each primary fishing area, a stratified random sampling design similar to that suggested by Malvestuto (1983) was used. The fishing day was the primary sampling unit. Daily estimates of variables of interest (total catch by species, expenditures by category, etc.) for each primary site were combined to form seasonal estimates using the formula for stratified random samples given by Cochran (1977).

Use of primary fishing areas

The primary fishing areas for pedestrian anglers were Waukegan Power Plant, Waukegan Harbor, Montrose Harbor, Diversey Harbor, Burnham Harbor, McCormick Place, Jackson Park, and Calumet Park. The primary fishing areas for launched boats were North Point Marina, Diversey Harbor, Burnham Harbor (east ramp), and Calumet Park. For each day of work, a creel clerk was assigned to visit three areas, two pedestrian areas and one launch area, in a prescribed order. The three areas were always one of four groups: (1) Waukegan Harbor (pedestrians), Waukegan Power Plant (pedestrians), North Point Marina (launched boats); (2) Montrose Harbor (pedestrians), Diversey Harbor (pedestrians), Diversey Harbor (launched boats); (3) Burnham Harbor (pedestrians), McCormick Place (pedestrians), Burnham Harbor east ramp, (launched boats); and (4) Jackson Park (pedestrians), Calumet Park (pedestrians), Calumet Park (launch ramps). The primary fishing areas accounted for 73% of pedestrian fishing and 55% of fishing from launched boats (Table 1). Estimates obtained for the primary fishing areas were extrapolated to all other areas based on the distributions of pedestrian anglers and boat trailers.

Selection of dates in a stratified random sample

The summer fishing season (1 April through 30 September 1992) was stratified by time period and type of day. Each date fell within one time period and was either a working day or a nonworking day (weekends and holidays). The following 16 strata were formed:

1. working days 4/1 - 4/19	2. nonworking days 4/1 - 4/19
3. working days 4/20 - 5/10	4. nonworking days 4/20 - 5/10
5. working days 5/11 - 5/31	6. nonworking days 5/11 - 5/31
7. working days 6/1 - 6/21	8. nonworking days 6/1 - 6/21
9. working days 6/22 - 7/12	10. nonworking days 6/22 - 7/12
11. working days 7/13 - 8/2	12. nonworking days 7/13 - 8/2
13. working days 8/3 - 8/23	14. nonworking days 8/3 - 8/23
15. working days 8/24 - 9/13	16. nonworking days 8/24 - 9/13
17. working days 9/14 - 9/30	18. nonworking days 9/14 - 9/30

Within each stratum dates were selected at random. This sampling process was conducted separately for each of the four groups of three areas. Three dates were selected from each stratum except 1, 2, 17 and 18; in those strata, which were several days shorter than the others, fewer than three dates were selected for each group of areas. All areas in each group were visited on the dates selected for that group.

Data collection

Data collection at pedestrian fishing areas consisted of counting all pedestrian anglers at the start and finish of a two-hour interview period and interviewing a representative sample of anglers during the two hours. For four of the primary pedestrian areas (Waukegan Harbor, Montrose Harbor, Burnham Harbor, and Jackson Park) the interview period was always 6:00 a.m. to 8:00 a.m.; for the other four (Waukegan Power Plant, Diversey Harbor, McCormick Place, and Calumet Park) the interview period was always 8:30 a.m. to 10:30 a.m. Each interview was designed for one angling party (i.e., one or more anglers fishing together) rather than for one individual angler. At launch ramps the number of angling boats returning to the ramp between 11:00 a.m. and 1:00 p.m. were counted and a representative sample of all returning fishing parties were interviewed.

The interviewers (referred to as creel clerks) gathered information related to effort (number of angler-hours, number of angler-trips), expenditures for the present fishing trip (by category: major = boat, motor, or trailer; minor = fishing gear; other = auto gas @ 10 cents per mile), species sought, and catch (by species). In previous years "minor" expenditures by pedestrians averaged $4.53 per angler-trip and "other" expenditures by pedestrians averaged $1.67 per angler-trip. For launched-boat anglers the corresponding values were $10.59 and $2.12. Those average expenditures were applied to 1992 anglers. Clerks also weighed and measured fish in possession of the anglers and noted clipped fins. The data form and instructions to creel clerks are reproduced in Appendix A.

Variables measured for each date

The data collected in the interviews on one date at one area were reduced to a set of variables describing daily fishing activity: (1) Catch per angler-hour was determined for each species and was the number of fish caught by all parties interviewed divided by the number of hours of fishing by individuals in those parties. (2) Expenditures per angler-trip was determined in each of three categories (major, minor, and other). For "major" expenditures total expenditures by all anglers interviewed was divided by the number of anglers interviewed. For "minor" and "other" expenditures, average expenditures per angler-trip was derived from past creel survey data. (3) Angler-hours (i.e., total time spent fishing by all anglers) and (4) angler-trips (i.e., total number of anglers who fished) were determined differently for pedestrians and boaters. For pedestrians, angler-hours was the average number of anglers (at start and finish of interviews) multiplied by the number of hours in the day (from 0.5 hour before sunrise to 0.5 hour after sunset), and angler-trips was angler-hours divided by the average duration of a pedestrian fishing trip (4.31 hours for all interviews with conventional pedestrian anglers during the 1987 survey). The number of fishing boats launched for the day was estimated by multiplying the number of fishing boats landing during the two-hour interview period by the estimated average ratio of the number of all boats returning in a day to the number returning between 11:00 a.m. and 1:00 p.m. That ratio was estimated to be 3.13 by monitoring all boat traffic at one of three launch ramps on 47 days in 1985, 1986, 1987, and 1988. Angler-trips was then estimated as the total number of boats launched for the day multiplied by the average number of anglers per boat (2.77, based on data from 1987). Angler-hours was taken as angler-trips multiplied by the yearly average number of hours per angling trip by boaters (5.25, based on data from 1987). (5) Catch was determined for each species as catch per angler-hour multiplied by angler-hours, and (6) expenditures was determined for each category as expenditures per angler-trip multiplied by angler-trips.

Expansion of daily estimates

The formula given by Cochran (1977) for stratified random samples was employed to expand the daily estimates to form seasonal area-specific estimates of effort, catch, and expenditures.

Seasonal averages of catch per angler-hour were obtained for each primary fishing area by taking unweighted averages of daily values. In these calculations, seasonal averages for yellow perch included only data from anglers who were fishing for perch, and seasonal averages for salmonids included only data from anglers who were fishing for salmonids.

Extrapolation to other areas

Extrapolations of seasonal estimates for primary fishing areas to other areas were based on the distributions of pedestrian anglers and boat trailers (Table 1). The distribution of boat trailers was assumed to reflect the distribution of launched-boat anglers. In the extrapolations, catch, effort, and expenditures at areas not visited were estimated by extension of results for the nearest primary fishing areas. Thus, for pedestrian anglers, results for Waukegan Harbor were extended to all other areas (except Waukegan Power Plant) north of and including Wilmette Harbor; results for Montrose Harbor were extended to all remaining areas north of Diversey Harbor; results for Diversey Harbor were extended to all remaining areas north of the Monroe Street breakwalls; results for Burnham Harbor were extended to all remaining areas north of McCormick Place, including the west ramp in Burnham Harbor; results for McCormick Place were extended to all remaining areas north of 31st Street; results from Jackson Park were extended to all remaining areas north of Rainbow Park; and results from Calumet Park were extended to all remaining areas south of (and including) Rainbow Park. For launched boats, results for North Point Marina were extended to all launch ramps north of Wilmette (including the "other" areas listed in Table 1); results for Diversey were extended to Dawes Park and the Wilson Avenue ramps; results for Burnham Harbor east ramp were extended to Burnham Harbor west ramp; results for Calumet Park were extended to the ramp at Jackson Park.

Moored Boats

To estimate effort, catch, and expenditures by anglers using moored boats, estimates for launched boats were extrapolated. First, the ratios of moored fishing boats to launched fishing boats for Waukegan Harbor, Diversey Harbor, and Burnham Harbor (east ramp) were estimated. On several dates during the summers of 1987 and 1988 counts were made of the numbers of fishing boats returning to moorings and to Larsen Marine I/O service at Waukegan Harbor while simultaneous counts were made of the number of fishing boats returning to the launch ramp. Charter boats were excluded from the counts. The ratio of moored to launched boats was 0.83 in Waukegan Harbor. In similar series of counts, the ratios were 0.92 in Diversey Harbor and 1.38 in Burnham Harbor (east ramp). Using these figures, seasonal estimates of effort, catch, and expenditures by anglers using launched boats at Waukegan, Diversey, and Burnham harbors were extrapolated to moored boats. Thus, for example, the moored boat catch at Waukegan Harbor for a given time period was estimated to be the launched boat catch for that time period multiplied by 0.83. Values so derived for Waukegan, Diversey, and Burnham harbors were then extrapolated to other moored boats based on the distribution of moored power boats (Table 2). Estimates for Waukegan Harbor were extrapolated to boats moored in North Point Marina, Wilmette Harbor, and Great Lakes Naval Training Station, and the combined estimates for Diversey Harbor and Burnham Harbor were extrapolated to all other boats moored in Chicago.

Yield Values

Here the term yield value means the hypothetical market price of the sport fish harvest. For salmonids, approximate market prices of whole fish, headed and gutted were used. For yellow perch market prices of fillets were used. The estimated catch for each species was multiplied by the average individual weight of fish weighed in our survey. That estimated harvested round weight was then multiplied by a factor to estimate the harvested market weight. For salmonids, the factor was 0.75 because approximately 25% of the weight of a salmonid is in the head and viscera. For yellow perch the factor was 0.40 because approximately 60% of the fish is wasted in the filleting process. Total harvested marketable weight was then multiplied by approximate market prices (Table 9).

Missing Data

On some dates creel clerks were unable to complete their assigned interviews. When data were missing from some but not all of the assigned dates in a stratum, estimates for the stratum were based on data from the completed dates. No special formula was used, but the sample size was smaller than for strata where all interviews were completed.

RESULTS

All estimates derived in this survey are often given here without qualification; for simplicity of expression, the word "approximately" is not repeated with each estimated value. Estimates are rounded in the following paragraphs.

Total fishing effort in the Illinois portion of Lake Michigan during the study period was 1.13 million angler-hours, with 62% of that attributable to summer pedestrian anglers (Table 4). Anglers caught 1,066,000 yellow perch, 4,500 brown trout, 5,400 rainbow trout, 5,400 lake trout, 56,000 coho salmon, and 8,000 chinook salmon (Table 4). Expenditures for boats, motors, trailers, fishing gear, and automobile gas used on Lake Michigan fishing trips during the study period were $8.6 million (Table 3). The yield value of the Illinois sport fishing harvest was $2.7 million.

Detailed results are presented in Tables 3 - 11. Tables 3 and 4 summarize all expenditure, catch, and effort estimates. Tables 5a, 5b, and 6 list seasonal catch and effort estimates for pedestrians and anglers using launched boats. Tables 7a, 7b, and 8 present catch rates for pedestrians and launched boaters. Table 9 provides yield values. Table 10 presents average weights of the six most important species, with separate estimates given for the catch of boaters, and pedestrians. Fin clips observed by our creel clerks are listed in Tables 11a and 11b, with the number of occurrences of each clip or clip combination listed by season and angler type.

Pedestrian Fishing

During the summer of 1992, pedestrian anglers made nearly 163,000 trips to Lake Michigan and spent 704,000 hours fishing (Tables 3 and 4). Total effort and catch were affected by the closing of the Commonwealth Edison property on the Waukegan shoreline to the public through most of the creel period. Yellow perch was the predominant species in their catch, with a harvest of 802,000 fish. Montrose Harbor was the most productive area, with 32% of the summer harvest of yellow perch by pedestrians, although catch rates by anglers fishing for yellow perch at Waukegan Harbor often exceeded those at Montrose Harbor during the mid-summer period. Coho salmon and brown trout were the next most important species for summer pedestrians, with a catch of 5,000 coho salmon and 3,300 brown trout. Pedestrian anglers spent $739,000 ($4.53 per trip) for fishing gear and $273,000 ($1.67 per trip) for automobile gas.

Fishing by Boaters Using Launched Boats

Anglers who used launched boats made over 45,000 trips to Lake Michigan and spent 235,000 hours fishing (Tables 3 and 4). The most abundant species in their catch were coho salmon (29,000), yellow perch (148,000) and chinook salmon (3,000). For Pacific salmon, North Point Marina was the most productive of the four primary launch areas, accounting for 26% of the coho salmon and 40% of the chinook salmon taken by anglers who used launched boats. Expenditures by anglers using launched boats reached over $4,741,000 ($105 per trip), with 87% of that amount going for boats, motors, and trailers.

Fishing by Boaters Using Moored Boats

Our estimates for boaters using boats kept at moorings were derived by extrapolation from estimates for boaters using launched boats. This group of anglers caught 22,000 coho salmon, 116,000 yellow perch and 3,000 chinook salmon, and spent nearly $2,850,000 for boats, motors, trailers, fishing gear, and automobile gas (we do not include mooring costs here).

Yield Values

The estimated yield values of the three most popular sport species were $1,259,000 (yellow perch), $890,000 (coho salmon), and $301,000 (chinook salmon).

Minor Species

In addition to the species for which results are presented in detail in Tables 3-11, creel clerks reported several other species of fish in possession of anglers. For some species we estimated the total number of fish caught along with actual numbers observed; estimates are given in brackets. Minor species catches were: brook trout (1 from Diversey Harbor); Atlantic salmon (4 from North Point Marina boat ramps, 1 from Calumet Park boat ramps, 1 from Burnham Harbor east boat ramps); white perch (12 from Calumet Park boat ramps, 2 from Jackson Park Harbor {est. = 956}); freshwater drum (2 from Jackson Park Harbor, 1 from Diversey Harbor, 1 from Calumet Park shoreline {est. = 430}); white sucker (2 from Waukegan Power Plant discharge channel); black bullhead (1 from Diversey Harbor piers, 1 from Montrose Harbor); rock bass (18 from Burnham Harbor, 3 from Burnham Harbor shoreline, 2 from Burnham Harbor pier, 27 from Diversey Harbor, 7 from Diversey Harbor piers, 5 from Jackson Park Harbor, 3 from Jackson Harbor pier, 10 from McCormick Place, 4 from Calumet Park pier, 1 from Calumet

Park shoreline, 1 from Calumet Park boat ramps, 10 from Montrose Harbor, 5 from Montrose Park shoreline, 2 from Waukegan Harbor piers {est. = 10,508}); pumpkinseed sunfish (8 from Calumet Park pier, 1 from Calumet Park shoreline, 3 from Diversey Harbor, 2 from Montrose Harbor {est. = 1,508}); bluegill sunfish (1 from Waukegan Harbor piers, 35 from Diversey Harbor, 3 from Montrose Harbor, 1 from Jackson Harbor {est. = 4,308}); and smallmouth bass (1 from Jackson Park Harbor, 2 from Diversey Harbor, 3 from Montrose Park shoreline, 4 from Calumet Park shoreline, 4 from Calumet Park pier, 2 from McCormick Place {est. = 1,723}). Anglers also caught alewives for use as bait.

Table 3. Effort (angler-trips) and expenditures (major, minor, and other).

Type of effort angler	Area	major (trips)	minor (boat etc)	other (gear)	(travel)
Pedestrians	Wau.Power	3,982	$0	$18,037	$6,650
	Wau.Harbor	24,508	$0	$111,019	$40,928
	Montrose	52,130	$0	$236,200	$87,076
	Diversey	5,880	$0	$26,802	$9,881
	Burnham	12,563	$0	$56,910	$20,980
	McCormick	2,923	$0	$13,244	$4,929
	Jackson	2,218	$0	$10,498	$3,870
	Calumet	5,282	$0	$23,928	$8,821
	other	53,466	$0	$242,835	$89,534
	TOTALS	162,951	$0	$739,473	$272,669
Launched boats	North Point	13,849	$493,181	$147,345	$30,471
	Diversey	2,144	$254,586	$21,743	$4,516
	Burnham	1,289	$399,633	$17,555	$3,599
	Calumet	4,066	$534,824	$59,212	$10,134
	others	23,807	$2,440,250	$268,462	$55,373
	TOTALS	45,155	$4,122,474	$514,318	$104,093
Moored Boats	TOTALS	36,602	$2,371,527	$396,492	$81,953
Summer Totals (rounded)		245,000	$6,494,000	$1,650,000	$459,000

Table 4. Effort (anglers-hours) and catch (by species).

Type of angler	Area	Effort (hours)	yellow perch	brown trout	rainbow trout	lake trout	coho salmon	chinook salmon
Peds	Wau.Pow.	17,161	0	1,389	122	0	133	0
	Wau.Har.	105,628	159,104	225	182	0	857	825
	Montrose	224,680	256,577	102	465	0	730	107
	Diversey	25,343	29,605	0	41	0	60	13
	Burnham	54,146	49,776	20	250	0	544	100
	McCorm.	12,848	10,975	0	198	0	26	69
	Jackson	10,098	21,973	0	132	0	251	0
	Calumet	22,766	6,615	30	0	0	625	58
	other	231,027	267,435	1,591	734	0	1,732	688
	TOTALS	703,694	802,059	3,357	2,124	0	4,959	1,859
Lau'd	N.Point.	72,939	43,558	144	545	1,227	7,681	1,269
	Diversey	9,701	4,402	15	55	9	1,329	14
	Burnham	6,789	6,019	53	86	0	1,454	58
	Calumet	21,653	13,055	79	37	9	2,455	43
	others	124,175	81,163	403	1,060	1,498	16,347	1,790
	TOTALS	235,257	148,197	693	1,783	2,742	29,267	3,173
Moored	TOTALS	190,374	116,036	457	1,478	2,712	22,183	2,942
Summer Totals		1,129,326	1,066,291	4,507	5,385	5,454	56,409	7,974

Table 5a. Effort and catch by pedestrian anglers (northern areas).

Time Period	Area	Effort (angler-hours)	Catch: yellow perch	brown trout	rainbow trout	lake trout	coho salmon	chinook salmon
4/1-	Wau'Power	8,555	0	945	85	0	13	0
4/19	Wau'Harbor	6,984	17	110	0	0	85	0
	Montrose	11,050	0	90	0	0	260	36
	Diversey	479	0	0	0	0	0	0
	others	17,077	11	1,046	85	0	148	11
4/20-	Wau'Power	6,823	0	394	37	0	83	0
5/10	Wau'Harbor	6,153	51	116	0	0	616	0
	Montrose	17,394	36,104	12	69	0	387	0
	Diversey	1,935	1,223	0	0	0	40	0
	others	18,253	12,169	475	58	0	656	0
5/11-	Wau'Power	1,783	0	50	0	0	37	0
5/31	Wau'Harbor	6,359	8,737	0	0	0	0	0
	Montrose	21,962	44,522	0	0	0	0	0
	Diversey	3,432	7,852	0	0	0	0	0
	others	16,328	27,658	50	0	0	37	0
6/1-	Wau'Power	0	0	0	0	0	0	0
6/21	Wau'Harbor	19,819	33,916	0	0	0	0	0
	Montrose	43,170	75,431	0	302	0	0	0
	Diversey	6,968	13,770	0	0	0	0	0
	others	33,752	60,210	0	90	0	0	0
6/22-	Wau'Power	0	0	0	0	0	0	0
7/12	Wau'Harbor	25,847	62,087	0	0	0	0	0
	Montrose	60,494	72,649	0	0	0	0	0
	Diversey	4,858	6,434	0	0	0	0	0
	others	40,728	70,428	0	0	0	0	0
7/13-	Wau'Power	0	0	0	0	0	0	0
8/2	Wau'Harbor	14,384	21,263	0	0	0	0	0
	Montrose	33,945	21,116	0	0	0	0	0
	Diversey	2,473	307	0	41	0	20	0
	others	22,501	20,953	0	44	0	22	0
8/3-	Wau'Power	0	0	0	0	0	0	0
8/23	Wau'Harbor	8,886	28,230	0	0	0	0	0
	Montrose	17,340	4,884	0	0	0	0	0
	Diversey	1,990	18	0	0	0	0	0
	others	13,310	20,461	0	0	0	0	0
8/24-	Wau'Power	0	0	0	0	0	0	0
9/13	Wau'Harbor	10,383	4,803	0	134	0	23	512
	Montrose	8,876	659	0	69	0	0	31
	Diversey	1,335	0	0	0	0	0	13
	others	11,076	3,426	0	111	0	16	368
9/14-	Wau'Power	0	0	0	0	0	0	0
9/30	Wau'Harbor	6,813	0	0	48	0	133	312
	Montrose	10,449	1,212	0	25	0	83	39
	Diversey	1,873	0	0	0	0	0	0
	others	9,725	363	0	40	0	114	222

Table 5b. Effort and catch by pedestrian anglers (southern areas).

Time period	Area	Effort (angler-hours)	Catch yellow perch	brown trout	rainbow trout	lake trout	coho salmon	chinook salmon
4/1-	Burnham	2,071	0	20	11	0	210	46
4/19	McCormick	44	0	0	0	0	0	0
	Jackson	580	0	0	0	0	131	0
	Calumet	4,378	0	12	0	0	447	58
	others	3,107	0	14	6	0	386	43
4/20-	Burnham	3,013	33	0	0	0	335	0
5/10	McCormick	133	63	0	0	0	0	0
	Jackson	1,384	4,237	0	0	0	120	0
	Calumet	3,252	146	19	0	0	178	0
	others	4,014	4,229	6	0	0	347	0
5/11-	Burnham	3,109	8,425	0	0	0	0	0
5/31	McCormick	1,422	2,583	0	0	0	0	0
	Jackson	831	2,985	0	0	0	0	0
	Calumet	1,514	1,216	0	0	0	0	0
	others	3,261	8,257	0	0	0	0	0
6/1-	Burnham	11,700	21,009	0	194	0	0	0
6/21	McCormick	2,919	5,119	0	0	0	0	0
	Jackson	1,194	1,990	0	132	0	0	0
	Calumet	2,266	1,667	0	0	0	0	0
	others	8,605	14,458	0	227	0	0	0
6/22-	Burnham	13,815	13,908	0	45	0	0	0
7/12	McCormick	3,227	1,978	0	0	0	0	0
	Jackson	3,731	11,079	0	0	0	0	0
	Calumet	4,449	2,245	0	0	0	0	0
	others	12,976	19,154	0	23	0	0	0
7/13-	Burnham	12,637	5,298	0	0	0	0	0
8/2	McCormick	2,242	717	0	198	0	0	0
	Jackson	1,354	1,619	0	0	0	0	0
	Calumet	3,155	524	0	0	0	0	0
	others	9,365	4,629	0	50	0	0	0
8/3-	Burnham	1,680	513	0	0	0	0	0
8/23	McCormick	114	0	0	0	0	0	0
	Jackson	380	64	0	0	0	0	0
	Calumet	2,475	348	0	0	0	0	0
	others	2,088	440	0	0	0	0	0
8/24-	Burnham	3,837	429	0	0	0	0	0
9/13	McCormick	1,695	18	0	0	0	26	69
	Jackson	505	0	0	0	0	0	0
	Calumet	715	273	0	0	0	0	0
	others	3,110	314	0	0	0	7	17
9/14-	Burnham	2,284	161	0	0	0	0	55
9/30	McCormick	1,053	498	0	0	0	0	0
	Jackson	139	0	0	0	0	0	0
	Calumet	562	196	0	0	0	0	0
	others	1,750	274	0	0	0	0	28

Table 6. Effort and catch by anglers using launched boats.

Time Period	Area	Effort (angler-hours)	Catch					
			yellow perch	brown brown	rainbow trout	lake trout	coho salmon	chinook salmon
4/1-	N.Point	1,041	0	0	18	19	57	0
4/19	Diversey	84	0	0	0	0	0	0
	Burnham	97	0	53	0	0	53	0
	Calumet	2,612	0	33	0	0	908	9
	others	1,763	0	217	22	23	298	0
4/20-	N.Point	3,716	0	0	11	6	1,085	0
5/10	Diversey	2,304	0	15	7	0	565	0
	Burnham	1,257	1,101	0	43	0	292	0
	Calumet	6,242	3,012	45	28	0	1,164	7
	others	11,514	4,563	12	196	8	2,963	0
5/11-	N.Point	11,033	146	0	121	9	2,336	46
5/31	Diversey	1,468	216	0	0	0	384	0
	Burnham	985	686	0	0	0	629	31
	Calumet	1,246	1,043	0	0	0	191	0
	others	18,582	3,171	0	148	11	5,715	182
6/1-	N.Point	15,040	3,354	0	141	263	2,801	21
6/21	Diversey	1,739	2,078	0	0	0	331	0
	Burnham	2,217	777	0	0	0	422	0
	Calumet	2,825	3,531	0	0	9	191	0
	others	28,735	8,894	0	171	320	5,392	25
6/22-	N.Point	12,151	19,663	0	66	221	923	258
7/12	Diversey	1,379	922	0	48	0	48	0
	Burnham	345	2,693	0	0	0	0	0
	Calumet	2,499	3,772	0	0	0	0	0
	others	17,264	35,699	0	117	268	1,158	314
7/13-	N.Point	13,615	5,987	86	79	299	365	371
8/2	Diversey	771	699	0	0	9	0	7
	Burnham	856	648	0	43	0	58	0
	Calumet	1,927	1,238	0	0	0	0	0
	others	20,672	10,482	104	272	370	681	456
8/3-	N.Point	9,895	14,409	20	70	304	0	158
8/23	Diversey	998	487	0	0	0	0	7
	Burnham	260	0	0	0	0	0	0
	Calumet	2,452	459	0	0	0	0	0
	others	13,887	17,887	25	9	370	0	197
8/24-	N.Point	4,309	0	28	26	97	115	253
9/13	Diversey	783	0	0	0	0	0	0
	Burnham	686	0	0	0	0	0	27
	Calumet	1,502	0	0	0	0	0	27
	others	8,666	0	34	32	118	139	418
9/14-	N.Point	2,139	0	9	13	9	0	162
9/30	Diversey	174	0	0	0	0	0	0
	Burnham	87	114	0	0	0	0	0
	Calumet	347	0	0	0	0	0	0
	others	3,093	468	11	16	11	0	197

Table 7a. Catch rates by pedestrian anglers (northern areas). For yellow perch, only data from anglers fishing for yellow perch were used. For the five salmonid species, only data from anglers fishing for salmonids were used. Asterisks represent instances when creel clerks found no anglers fishing for the species in question.

		Catch per angler-hour					
Time Period	Area	yellow perch	brown trout	rainbow trout	lake trout	coho salmon	chinook salmon
4/1-	Wau' Power	*	0.104	0.011	0.000	0.003	0.000
4/19	Wau' Harbor	0.000	0.014	0.000	0.000	0.013	0.000
	Montrose	*	0.010	0.000	0.000	0.032	0.006
	Diversey	0.000	0.000	0.000	0.000	0.000	0.000
4/20-	Wau' Power	*	0.061	0.007	0.000	0.013	0.000
5/10	Wau' Harbor	1.098	0.019	0.000	0.000	0.110	0.000
	Montrose	3.053	0.000	0.009	0.000	0.074	0.000
	Diversey	0.718	0.000	0.000	0.000	0.066	0.000
5/11-	Wau' Power	*	0.075	0.000	0.000	0.024	0.000
5/31	Wau' Harbor	2.656	0.000	0.000	0.000	0.000	0.000
	Montrose	1.832	0.000	0.000	0.000	0.000	0.000
	Diversey	2.360	0.000	0.000	0.000	0.000	0.000
6/1-	Wau' Power	*	*	*	*	*	*
6/21	Wau' Harbor	1.819	*	*	*	*	*
	Montrose	1.632	*	*	*	*	*
	Diversey	1.524	0.000	0.000	0.000	0.000	0.000
6/22-	Wau' Power	*	*	*	*	*	*
7/12	Wau' Harbor	2.494	*	*	*	*	*
	Montrose	1.199	*	*	*	*	*
	Diversey	1.180	*	*	*	*	*
7/13-	Wau' Power	*	*	*	*	*	*
8/2	Wau' Harbor	1.145	*	*	*	*	*
	Montrose	0.471	*	*	*	*	*
	Diversey	0.089	*	*	*	*	*
8/3-	Wau' Power	*	*	*	*	*	*
8/23	Wau' Harbor	3.778	0.000	0.000	0.000	0.000	0.000
	Montrose	0.219	*	*	*	*	*
	Diversey	0.030	0.000	0.000	0.000	0.000	0.000
8/24-	Wau' Power	*	*	*	*	*	*
9/13	Wau' Harbor	1.318	0.000	0.015	0.000	0.003	0.059
	Montrose	0.345	0.000	0.013	0.000	0.000	0.007
	Diversey	0.000	0.000	0.000	0.000	0.000	0.015
9/14-	Wau' Power	*	*	*	*	*	*
9/30	Wau' Harbor	0.000	0.000	0.003	0.000	0.019	0.046
	Montrose	0.400	0.000	0.003	0.000	0.020	0.015
	Diversey	0.000	0.000	0.000	0.000	0.000	0.000

Table 7b. Catch rates by pedestrian anglers (southern areas). For yellow perch, only data from anglers fishing for **yellow perch were used.** For the five salmonid species, only data from anglers fishing for salmonids were used. **Asterisks** represent instances when creel clerks found no anglers fishing for the species in question.

Time Period	Area	Catch per angler-hour: yellow perch	brown trout	rainbow trout	lake trout	coho salmon	chinook salmon
4/1-4/19	Burnham	0.000	0.017	0.006	0.000	0.146	0.031
	McCormick	*	0.000	0.000	0.000	0.000	0.000
	Jackson	*	0.000	0.000	0.000	0.216	0.000
	Calumet	*	0.003	0.000	0.000	0.094	0.007
4/20-5/10	Burnham	0.000	0.000	0.000	0.000	0.086	0.000
	McCormick	1.017	0.000	0.000	0.000	0.000	0.000
	Jackson	4.360	0.000	0.000	0.000	0.197	0.000
	Calumet	0.262	0.012	0.000	0.000	0.032	0.000
5/11-5/31	Burnham	2.656	*	*	*	*	*
	McCormick	2.063	*	*	*	*	*
	Jackson	1.490	0.000	0.000	0.000	0.000	0.000
	Calumet	0.902	0.000	0.000	0.000	0.000	0.000
6/1-6/21	Burnham	1.314	*	*	*	*	*
	McCormick	1.940	*	*	*	*	*
	Jackson	1.392	*	*	*	*	*
	Calumet	0.757	0.000	0.000	0.000	0.000	0.000
6/22-7/12	Burnham	0.855	*	*	*	*	*
	McCormick	0.640	*	*	*	*	*
	Jackson	3.936	*	*	*	*	*
	Calumet	0.521	*	*	*	*	*
7/13-8/2	Burnham	0.380	*	*	*	*	*
	McCormick	0.336	*	*	*	*	
	Jackson	0.849	*	*	*	*	*
	Calumet	0.122	*	*	*	*	*
8/3-8/23	Burnham	0.295	*	*	*	*	*
	McCormick	0.000	*	*	*	*	*
	Jackson	0.435	0.000	0.000	0.000	0.000	0.000
	Calumet	0.084	*	*	*	*	*
8/24-9/13	Burnham	0.195	0.000	0.000	0.000	0.000	0.000
	McCormick	0.128	0.000	0.000	0.000	0.010	0.033
	Jackson	*	0.000	0.000	0.000	0.000	0.000
	Calumet	0.259	0.000	0.000	0.000	0.000	0.000
9/14-9/30	Burnham	0.627	0.000	0.000	0.000	0.000	0.021
	McCormick	2.942	0.000	0.000	0.000	0.000	0.000
	Jackson	*	0.000	0.000	0.000	0.000	0.000
	Calumet	0.762	0.000	0.000	0.000	0.000	0.000

Table 8. Catch rates by anglers using launched boats. For yellow perch, only data from anglers fishing for yellow perch were used. For the five salmonid species, only data from anglers fishing for salmonids were used. Asterisks represent instances when creel clerks found no anglers fishing for the species in question.

		Catch per angler-hour					
Time Period	Area	yellow perch	brown trout	rainbow trout	lake trout	coho salmon	chinook salmon
4/1- 4/19	N.Point	*	0.000	0.018	0.017	0.052	0.000
	Diversey	*	0.000	0.000	0.000	0.000	0.000
	Burnham	*	0.182	0.000	0.000	0.182	0.000
	Calumet	*	0.022	0.000	0.000	0.433	0.002
4/20- 5/10	N.Point	*	0.000	0.003	0.001	0.277	0.000
	Diversey	*	0.009	0.001	0.000	0.210	0.000
	Burnham	3.796	0.000	0.048	0.000	0.287	0.000
	Calumet	3.987	0.023	0.007	0.000	0.257	0.000
5/11- 5/31	N.Point	0.565	0.000	0.020	0.000	0.188	0.002
	Diversey	0.975	0.000	0.000	0.000	0.236	0.000
	Burnham	5.102	0.000	0.000	0.000	0.391	0.030
	Calumet	2.565	0.000	0.000	0.000	0.112	0.000
6/1- 6/21	N.Point	2.273	0.000	0.011	0.022	0.219	0.001
	Diversey	5.236	0.000	0.000	0.000	0.218	0.000
	Burnham	2.179	0.000	0.000	0.000	0.229	0.000
	Calumet	0.821	0.000	0.000	0.009	0.244	0.000
6/22- 7/12	N.Point	3.175	0.000	0.021	0.022	0.140	0.017
	Diversey	1.034	0.000	0.061	0.000	0.061	0.000
	Burnham	5.437	*	*	*	*	*
	Calumet	1.699	0.000	0.000	0.000	0.000	0.000
7/13- 8/2	N.Point	1.977	0.007	0.005	0.022	0.026	0.043
	Diversey	1.077	0.000	0.000	0.060	0.000	0.009
	Burnham	0.751	0.000	0.048	0.000	0.098	0.000
	Calumet	0.530	0.000	0.000	0.000	0.000	0.000
8/3- 8/23	N.Point	4.127	0.002	0.034	0.088	0.000	0.042
	Diversey	0.655	0.000	0.000	0.000	0.000	0.033
	Burnham	0.000	0.000	0.000	0.000	0.000	0.000
	Calumet	0.146	*	*	*	*	*
8/24- 9/13	N.Point	0.000	0.007	0.006	0.023	0.028	0.055
	Diversey	0.000	0.000	0.000	0.000	0.000	0.000
	Burnham	0.000	0.000	0.000	0.000	0.000	0.033
	Calumet	0.000	0.000	0.000	0.000	0.000	0.054
9/14- 9/30	N.Point	*	0.005	0.007	0.005	0.000	0.079
	Diversey	*	0.000	0.000	0.000	0.000	0.000
	Burnham	0.657	*	*	*	*	*
	Calumet	0.000	0.000	0.000	0.000	0.000	0.000

Table 9. Yield values. Yellow perch are assumed to be prepared as fillets with 60% waste and salmonids as whole gutted fish with 25% waste. Prices for all except brown trout are those current in February 1992.

Species	Total catch	Av. wt (lbs)	Round wt (lbs)	Market wt (lbs)	Price per pound	Yield value
yellow perch	1,129,326	0.31	350,091	140,036	$8.99	$1,258,924
brown trout	4,507	4.00	18,028	13,521	$3.88	$52,461
rainbow trout	5,385	6.25	33,656	25,242	$3.88	$97,939
lake trout	5,454	7.29	39,760	29,820	$4.99	$148,802
coho salmon	56,408	3.01	169,788	127,341	$6.99	$890,114
chinook salmon	7,975	7.20	57,420	43,065	$6.99	$301,024

Combined yield value of all species: $2,749,264

Table 10. Average weights (coho salmon, chinook salmon, rainbow trout, lake trout, brown trout, and yellow perch). Weights are in pounds. Sample sizes (n) are shown. Seasons are defined by the following dates: spring = 4/1-5/10, early summer = 5/11-6/21, midsummer = 6/22-8/2, late summer = 8/3-9/13, early fall = 9/14-9/30. Asterisks represent situations where no fish were measured.

			Spring	----------Summer---------			Fall
Species	Angler type			early	mid	late	
coho	boaters	av.	2.58	3.23	5.78	4.71	*
salmon		n	165	103	32	9	0
	pedestrians	av.	2.39	5.36	*	2.86	3.14
		n	83	1	0	3	6
chinook	boaters	av.	*	6.92	5.39	4.03	4.31
salmon		n	0	1	21	42	17
	pedestrians	av.	7.55	*	4.80	13.81	11.24
		n	3	0	2	12	15
rainbow	boaters	av.	5.36	6.39	8.34	5.44	1.96
trout		n	8	5	4	8	1
	pedestrians	av.	5.08	*	9.15	6.55	7.40
		n	7	0	2	3	3
lake	boaters	av.	9.15	6.67	7.94	6.91	2.97
trout		n	2	7	23	20	1
	pedestrians	av.	*	*	*	*	*
		n	0	0	0	0	0
brown	boaters	av.	3.36	*	3.58	5.49	1.96
trout		n	6	0	3	4	1
	pedestrians	av.	3.93	5.80	*	*	*
		n	67	1	0	0	0
yellow	boaters	av.	0.37	0.22	0.33	0.33	0.22
perch		n	7	4	102	30	3
	pedestrians	av.	0.26	0.33	0.32	0.25	0.20
		n	107	414	439	128	27

Table 11. Fin clip summary for salmonids. Seasons are defined by the following dates: spring = 4/1-5/10, early summer = 5/11-6/21, midsummer = 6/22-8/2, late summer = 8/3-9/13, early fall = 9/14-9/30. Occurrences of clips are shown separately for two types of anglers: boaters (b), and pedestrians (p).

		SPRING		-------SUMMER-------						FALL	
				early		mid		late			
Species	Clip	b	p	b	p	b	p	b	p	b	p
coho	ad	1	0	2	0	0	0	1	0	0	0
salmon	ad,lp	0	0	0	0	0	0	1	0	0	0
	ad,rp	0	0	2	0	0	0	1	0	0	0
	lp	1	0	0	0	0	0	0	0	0	0
	lv	1	2	0	0	0	0	0	0	0	0
	lv,rv	0	0	1	0	0	0	0	0	0	0
	rm	0	0	1	0	0	0	0	0	0	0
	rp	0	0	1	0	0	0	0	0	0	1
	rv	2	2	2	0	0	0	1	0	0	0
---	no clips	160	79	94	1	32	0	5	3	0	9
chinook	ad	0	0	0	0	0	0	1	0	0	1
salmon	ad,do	0	0	0	0	0	0	0	0	0	1
	ad,lv	0	0	0	0	0	0	1	0	1	0
	ad,rv	0	0	0	0	0	0	1	0	0	0
	lm	0	0	0	0	0	0	0	0	0	1
	lp	0	0	0	0	2	0	4	0	0	1
	lv	0	0	0	0	0	0	1	0	0	1
	lv,rp	0	0	0	0	0	0	1	1	0	1
	rv	0	0	0	0	0	0	0	0	1	0
	no clips	0	3	1	0	19	0	33	13	15	27
rainbow	ad	0	1	0	0	0	0	0	0	0	0
trout	do	1	0	0	0	0	0	0	0	0	0
	lm	0	1	0	0	0	0	0	0	0	0
	lp	1	0	0	0	0	0	0	0	0	0
	lp,lv,rv	1	0	0	0	0	0	1	0	0	0
	no clips	5	5	5	0	4	1	7	4	1	5
lake	ad	0	0	2	0	6	0	6	0	0	0
trout	ad,lp	0	0	1	0	4	0	3	0	0	0
	ad,lv	0	0	2	0	2	0	2	0	0	0
	ad,lv,rv	0	0	0	0	0	0	0	0	0	0
	ad,rp	1	0	0	0	3	0	0	0	0	0
	ad,rv	0	0	0	0	2	0	0	0	0	0
	do	0	0	0	0	1	0	2	0	0	0
	do,lv	0	0	0	0	1	0	0	0	0	0
	lv	0	0	0	0	0	0	1	0	1	0
	lv,rv	0	0	1	0	0	0	1	0	0	0
	rv	0	0	0	0	3	0	4	0	0	0
	no clips	1	0	1	0	0	0	1	0	0	0

Table 11. continued

brown	lm	0	1	0	0	0	0	0	0	0	0
trout	lm,rv	0	1	0	0	0	0	0	0	0	0
	lp	0	2	0	0	1	0	0	0	0	1
	lp,rp	0	3	0	0	0	0	0	0	0	0
	lv	0	4	0	0	0	0	0	0	0	0
	lp,lv,rm,rv	0	1	0	0	0	0	0	0	0	0
	rp	0	1	0	0	0	0	0	0	0	0
	no clips	6	54	0	1	2	0	4	0	1	0

DISCUSSION

Comparisons with preceding years

Total effort fell in 1992 mostly because of a drop in pedestrian angler effort in mid to late summer. Launched boat effort increased after a drop in effort in 1991 (Figure 3). North Point Marina continues to receive increased usage by launched boat anglers with a 10% increase over 1991. Moored boat effort increased for the third consecutive year (Figure 3). After missing a year of helicopter overflights the shoreline and trailer parking areas were aerial surveyed four times in 1992. A comparison between the contact creel and aerial survey showed generally good agreement (Figures 6a and 6b).

Yellow perch catch was high in 1986 through 1988, averaging over 1,500,000, but dropped by nearly 50% in 1989 to 889,000. In 1990 the yellow perch harvest recovered to the 1986-88 levels. The yellow perch harvest fell to 1,317,000 in 1991 and to 1,066,000 in 1992 mostly because of poor weather and water conditions from late July through August in both years (Figure 7). Extremely clear water in the summer of 1992 put the yellow perch out of the reach of most pedestrian anglers who traditionally catch the majority of the perch. However the average size of the yellow perch kept by anglers in 1992 was significantly larger than the preceeding years (Figures 4, 17 and 18).

The 1992 harvest of coho salmon bounced back to 1990 levels after the terrible 1991 harvest (Figure 8). The bulk of the increase occurred in the launched and moored boat fishery with only a very modest increase in the pedestrian fishery. A regulation change in bag limits (the "5-3-2" rule) probably caused this harvest to be less than it could have been under the old rules since many anglers limited out with 3 cohos each instead of 5. This rule, as given in the fishing regulations, is stated as "5 fish (singly or collectively) daily creel limit; no more than 3 fish of any one species (except lake trout where 2 fish is the daily creel limit)". The average size of creeled cohos in 1992 was 5% larger by weight and slightly longer than the 1991 cohos (Figures 15, 19a-c and Table 9). The fluctuations in total harvest of cohos during the creel survey could not be explained by variations in numbers stocked (Figures 13a and 13b).

After the increase in the chinook harvest in 1991, the 1992 harvest dropped to the lowest level since this survey began. Harvest fell off in all three regular categories and also harvest fell in the fall snagging fishery (Figure 9 and appendix c). The average length and weight also fell to the lowest levels since this survey began (Figure 15 and Table 9). Looking at the lengths of chinook salmon creeled in the summer and fall (Figures 20a and 20b) the catch apparently included a significant number of small, young fish (1 and 2 year olds). Only three fish were measured in the spring of 1992 so they were not charted. Unlike the coho salmon there does seem to be a relationship between the number of chinooks harvested and the number of chinooks stocked (Figures 14a and 14b). Unfortunately the ratio of stocked fish to harvested fish decreased steadily after 1987.

The harvest of lake trout dropped by 10% from 1991 levels (Figure 10). The average length decreased slightly from 1991 and the weight increased slightly (Figures 16, 22 and Table 9). The harvest of lake trout seems to be governed more by demand than supply for the anglers surveyed for this study, so that increases and decreases in harvest often reflect the abundance of other species. For example, when Pacific salmon are scarce lake trout are harvested more and when the salmon are abundant the lake trout harvest decreases.

The 1992 brown trout harvest was less than the 1991 harvest by 32% (Figure 12). Part of this shortfall may be because of the closure of the Commonwealth Edison property in Waukegan in late May througth the rest of the creel season. Therefore, a fall fishery for brown trout did not occur at this site in 1992. Despite the early closing, this location provided nearly 30% of the total harvest. Coho fishing was much better in 1992 so that boat anglers may not have targeted browns because of the abundance of cohos. The average lengths and weights of creeled brown trout were slightly longer and heavier than in 1991 (Figures 16, 21 and Table 9).

The 1992 rainbow trout harvest increased dramatically, more than double the numbers caught in 1991 (Figure 11). The biggest increase was in the pedestrian fishery which went from a harvest of 327 in 1991 to 2,124 in 1992. The boat harvest increased by over 1,000 fish. The average length and weight of creeled rainbow trout increased compared to 1991 (Figures 16, 23 and Table 9).

Estimated expenditures for boats, motors, and trailers, which had jumped markedly between 1987 and 1988, returned to previous levels in 1989-1992. Tables 12 and 13 summarize these and other results from this series of creel surveys. Creel survey methods were different in the seven years, so comparisons should be made with caution, especially where estimates for anglers using moored boats are concerned.

Table 12. Summer effort and expenditures in 1986 - 1992.

Type of angler	Year	Effort (angler-trips)	Expenditures major (boat)	minor (gear)	other (travel)
Pedestrians	1986	299,454	$0	$844,000	$397,000
	1987	289,307	$0	$1,674,000	$475,000
	1988	250,251	$0	$1,133,000	$417,000
	1989	167,396	$0	$758,000	$280,000
	1990	183,446	$0	$831,000	$306,000
	1991	196,151	$0	$889,000	$323,000
	1992	162,951	$0	$739,000	$273,000
Launched Boats	1986	71,009	$2,079,000	$1,598,000	$131,000
	1987	54,043	$2,427,000	$618,000	$119,000
	1988	58,009	$8,061,000	$614,000	$123,000
	1989	40,261	$3,229,000	$426,000	$85,000
	1990	45,394	$2,115,000	$481,000	$99,000
	1991	37,693	$2,196,000	$391,000	$85,000
	1992	45,155	$4,122,000	$514,000	$104,000
Moored Boats	1986	74,307	$2,022,000	$2,395,000	$138,000
	1987	28,911	$996,000	$363,000	$60,000
	1988	34,321	$5,251,000	$373,000	$73,000
	1989	23,084	$1,449,000	$244,000	$49,000
	1990	24,752	$803,000	$262,000	$54,000
	1991	32,004	$1,786,00	$331,000	$72,000
	1992	36,602	$2,372,000	$396,000	$82,000
Summer Totals	1986	444,770	$4,101,000	$4,837,000	$666,000
	1987	372,261	$3,423,000	$2,655,000	$654,000
	1988	344,422	$13,312,000	$2,120,000	$613,000
	1989	230,741	$4,678,000	$1,428,000	$414,000
	1990	253,592	$2,919,000	$1,574,000	$460,000
	1991	268,445	$3,982,000	$1,611,000	$484,000
	1992	244,707	$6,494,000	$1,650,000	$459,000

Table 13. Summer effort and catch in 1986 - 1992.

Angler type	Year	EFFORT (angler-hours)	CATCH yellow perch	brown trout	rainbow trout	lake trout	coho salmon	chinook salmon
Peds	1986	1,278,678	1,614,979	5,478	2,914	171	20,415	5,455
	1987	1,252,796	1,715,219	10,982	2,486	55	13,101	9,066
	1988	1,077,816	1,636,985	4,912	2,346	33	17,577	3,815
	1989	721,476	819,821	3,599	2,515	0	12,991	3,550
	1990	790,651	1,393,047	2,570	1,284	0	8,438	4,216
	1991	845,409	1,071,774	4,351	327	29	4,400	2,674
	1992	703,694	802,059	3,357	2,124	0	4,959	1,859
Lau'd	1986	386,287	53,316	2,094	2,849	1,030	43,539	11,856
	1987	285,076	84,172	690	811	2,299	14,861	8,266
	1988	304,547	73,999	836	1,545	2,188	32,016	3,556
	1989	262,223	43,132	2,363	1,595	2,544	48,246	4,454
	1990	238,317	97,771	1,168	1,659	1,483	30,833	4,060
	1991	195,676	152,403	1,092	1,111	2,803	7,708	5,333
	1992	235,257	148,197	693	1,783	2,742	29,267	3,173
Moo'd	1986	404,232	24,973	1,633	3,772	641	52,219	12,482
	1987	151,770	20,964	330	444	1,286	8,855	4,057
	1988	180,186	34,980	485	868	1,446	19,205	2,107
	1989	148,570	21,405	1,272	950	1,537	25,098	2,643
	1990	129,944	40,682	621	1,023	852	18,094	2,468
	1991	179,583	92,457	1,192	1,123	3,172	8,179	6,280
	1992	190,374	116,036	457	1,478	2,712	22,183	2,942
Summer Totals	1986	2,069,197	1,693,268	9,205	9,535	1,842	116,173	29,793
	1987	1,689,642	1,820,355	12,002	3,751	3,640	36,817	21,389
	1988	1,572,210	1,747,027	6,269	4,813	3,736	70,123	9,607
	1989	1,132,269	884,358	7,233	5,059	4,081	86,335	10,646
	1990	1,158,911	1,531,500	4,359	3,966	2,336	57,365	10,744
	1991	1,220,668	1,316,633	6,635	2,561	6,003	20,287	14,287
	1992	1,129,326	1,066,291	4,507	5,385	5,454	56,409	7,974

The most important differences between the methods of collecting and analyzing data used in these seven years are these: (1) In 1986 six pedestrian areas and three launch areas were visited for interviews; in 1987 through 1992 eight pedestrian areas and four launch areas were visited. ~~Thus~~ higher proportions of total catch, effort, and expenditures were estimated directly in 1987 through 1992 than in 1986, and lower proportions were estimated by extrapolation to areas that were not visited. (2) Several parameters used in deriving estimates are themselves estimated, and the estimated values were different in the seven years. Table 14 lists the values of these parameters used each year. (3) The formulae for extrapolating catch, effort, and expenditures by anglers using launched boats to estimate those things for anglers using moored boats were quite different in the seven years. This occurred because the estimated ratios of moored boat traffic to launched boat traffic for Diversey Harbor and Burnham Harbors changed greatly between 1986 and 1988 (Table 14) as new data became available. (4) Average

expenditures per angler-trip for "minor" and "other" expenditures (see Methods) were not estimated independently from 1989 to 1992, but were derived from previous creel surveys.

Table 14. Parameters used in deriving estimates.

Parameter	1986	1987	1988 - 1992
Duration of fishing trip (hours)			
summer pedestrians	4.27	4.31	4.31
launched boats	5.44	5.25	5.25
Number of anglers per launched boat	2.91	2.77	2.77
Ratio of number of launched boats returning in a day to the number returning between 11:00 a.m. and 1:00 p.m.	3.125	2.94	3.13
Ratio of number of moored boats used for fishing on any day to number of launched boats used for fishing.			
Waukegan Harbor	0.82	0.83	0.83
Diversey Harbor	2.39	1.54	0.92
Burnham Harbor (East)	no est.	0.34	1.38
Distributions of pedestrian anglers, launched boats, and moored boats (Tables 1 and 2).	Differences between years were slight, except that North Point Marina has become the major port for launching boats.		

Confidence Intervals and Bias

Estimates of catch, effort, and expenditures are presented above without confidence intervals. Confidence intervals presented without estimates of bias are meaningful only if bias is assumed to be negligible, an assumption that we are not willing to make. Although we have collected and will continue to collect data with which to partially assess biases, we are presently unable to make such assessments. Table 14 lists the parameters used in our estimation procedures. Those parameters, to the extent that they are incorrect, introduce bias into the estimation process. Other sources of bias in this survey include the assumption that fishing effort and catch rates during the times of our interview sets (6:00 a.m. to 8:00 a.m. or 8:30 a.m. to 10:00 a.m. for pedestrians; 11:00 a.m. to 1:00 p.m. for launched boat anglers) are, on average, representative of the entire day.

REFERENCES

Cochran, W.G. 1977. Sampling techniques, 3rd ed. John Wiley and Sons, New York. 428 pp.

Coshun, M. 1993. Lake Michigan, four state salmonid stocking summary, presented at the Great Lakes Fishery Commision meeting, Lake Michigan Committee, March 1993, Wisconsin Department of Natural Resources, 7pp.

Horns, W.H. 1988. A survey of sportfishing in the Illinois portion of Lake Michigan - April 1987 through March 1988. Aquatic Biology Technical Report 88/7. Illinois Natural History Survey, Champaign, Illinois, 37pp.

Horns, W.H. 1989. A survey of sportfishing in the Illinois portion of Lake Michigan - April 1988 through March 1989. Aquatic Ecology Technical Report 89/6. Illinois Natural History Survey, Champaign, Illinois, 36pp.

Horns, W.H., and W.A. Brofka. 1990. A survey of sport fishing in the Illinois portion of Lake Michigan - April 1989 through September 1989. Aquatic Ecology Technical Report 90/3. Illinois Natural History Survey, Champaign, Illinois, 31 pp.

Horns, W.H., and W.A. Brofka. 1991. A survey of sport fishing in the Illinois portion of Lake Michigan: April 1990 through September 1990. Aquatic Ecology Technical Report 91/3. Illinois Natural History Survey, Champaign, Illinois, 33 pp.

Horns, W.H., and W.A. Brofka. 1992. A survey of sport fishing in the Illinois portion of Lake Michigan April 1991 through September 1991. Aquatic Ecology Technical Report 92/4. Illinois Natural History Survey, Champaign, Illinois, 32 pp.

Horns, W.H., and R.W. Gorden. 1986. A sport fishing creel survey of the Illinois portion of Lake Michigan. Aquatic Biology Technical Report 86/3. Illinois Natural History Survey, Champaign, Illinois, 46 pp.

Horns, W.H., and R.W. Gorden, 1988. A sport fishing creel survey of the Illinois portion of Lake Michigan. Aquatic Biology Technical Report 88/2. Illinois Natural History Survey, Champaign, Illinois, 46 pp.

Malvestuto, S.P. 1983. Sampling the recreational fishery. Pages 397-419 in L.A. Nielsen and D.L. Johnson, eds., Fisheries Techniques. American Fisheries Society. Bethesda, Maryland. 1983.

Muench, B. 1981. 1979. Sport fishing creel survey on the Illinois portion of Lake Michigan. Division of Fisheries, Illinois Department of Conservation (mimeo). 25 p.

ACKNOWLEDGMENTS

We thank Rich Hess for his coordination and advice; Nan Trudeau for assisting with the coordination and scheduling of the project; Martha Kneuer for data entry; Tammy Keniry, Michael Keniry, Timothy Macek, Rob Pope, and Steve Robillard for their long hours in the field collecting data. This study is a continuation of a 6-year project conceived and implemented by William H. Horns and Robert W. Gorden.

Figure 3. Effort by angler type 1986-1992

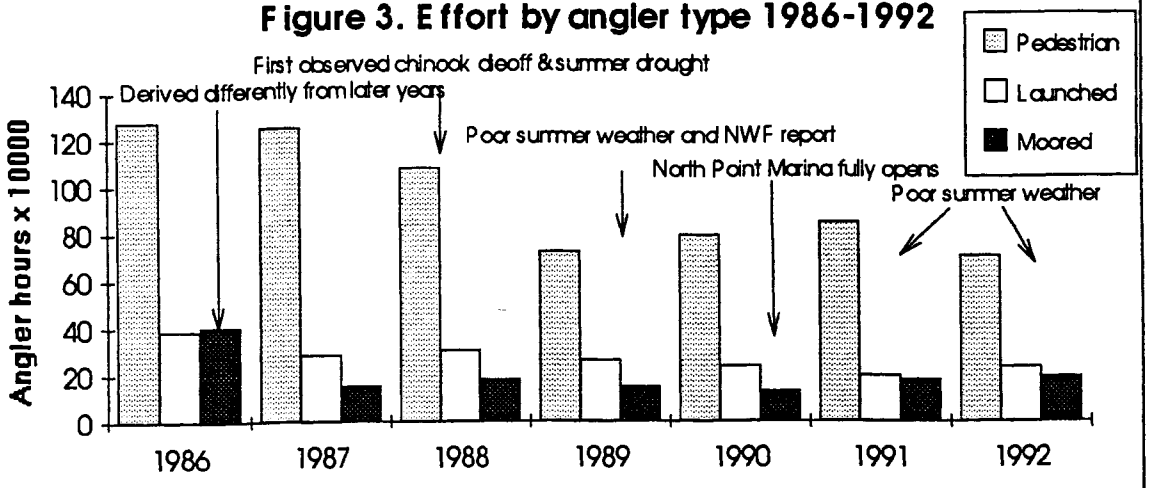


Figure 4. Comparison of biomass harvested 1986-1992

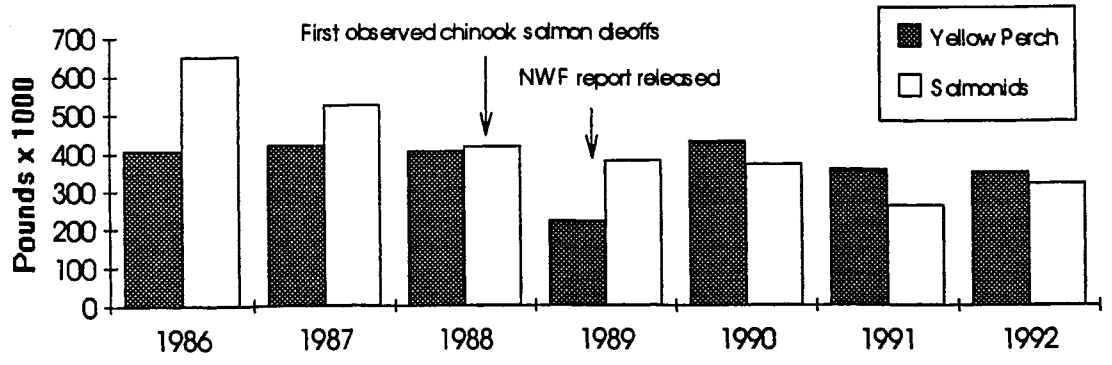


Figure 5. Total catch and effort 1986-1992

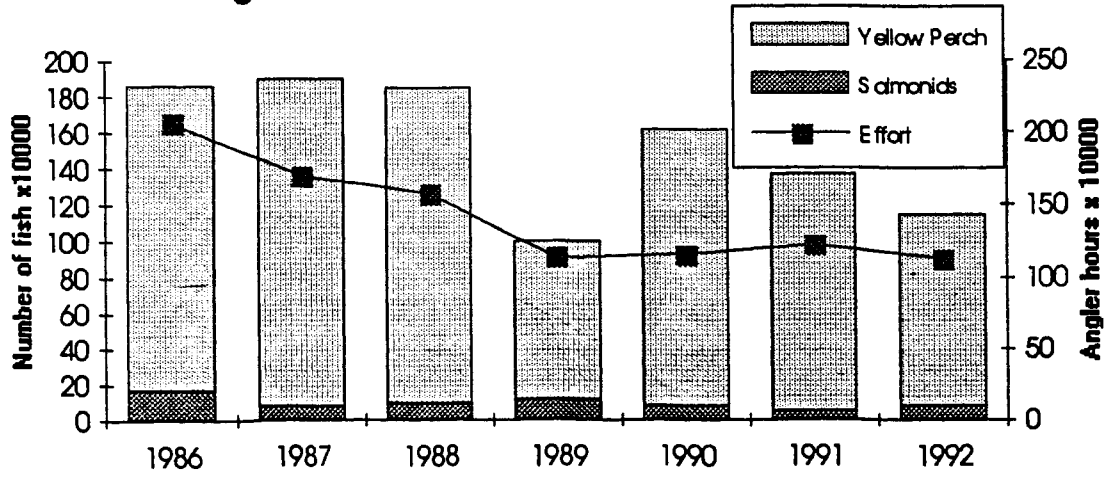


Figure 6 (a). 1992 total launched fishing boats vs aerial observed boat trailers

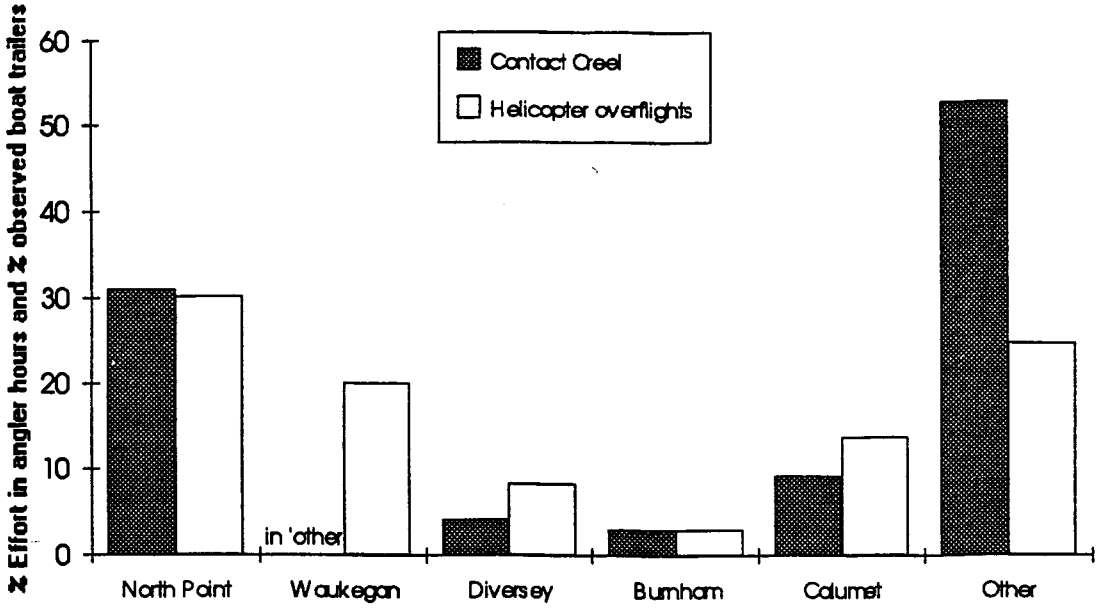


Figure 6 (b). 1992 total pedestrian effort vs aerial observed anglers

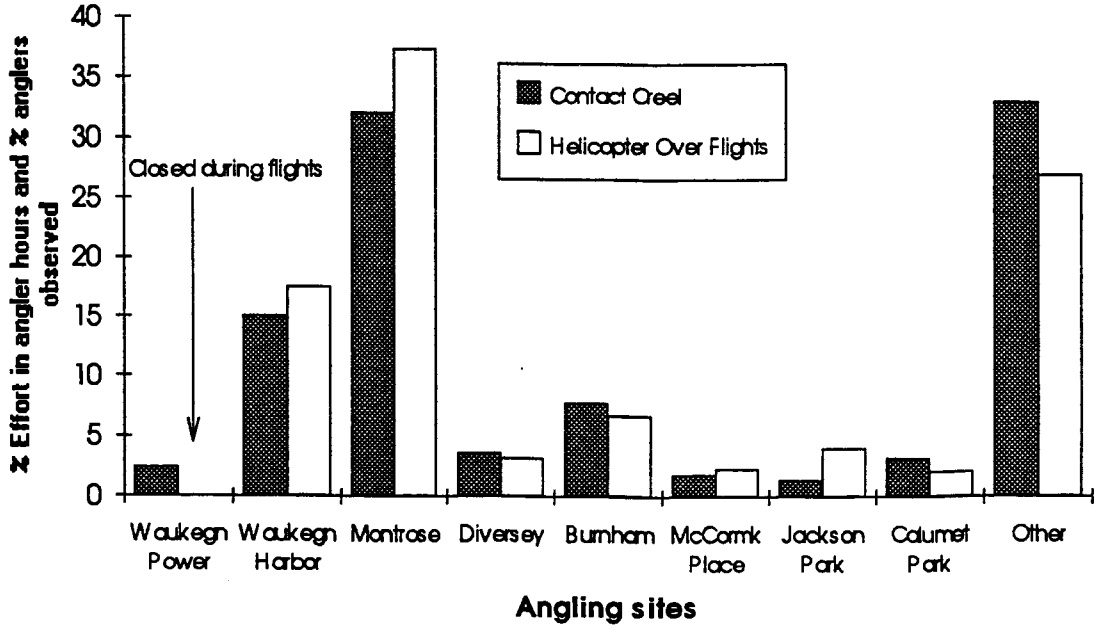


Figure 7. Total yellow perch sport catch 1986-1992

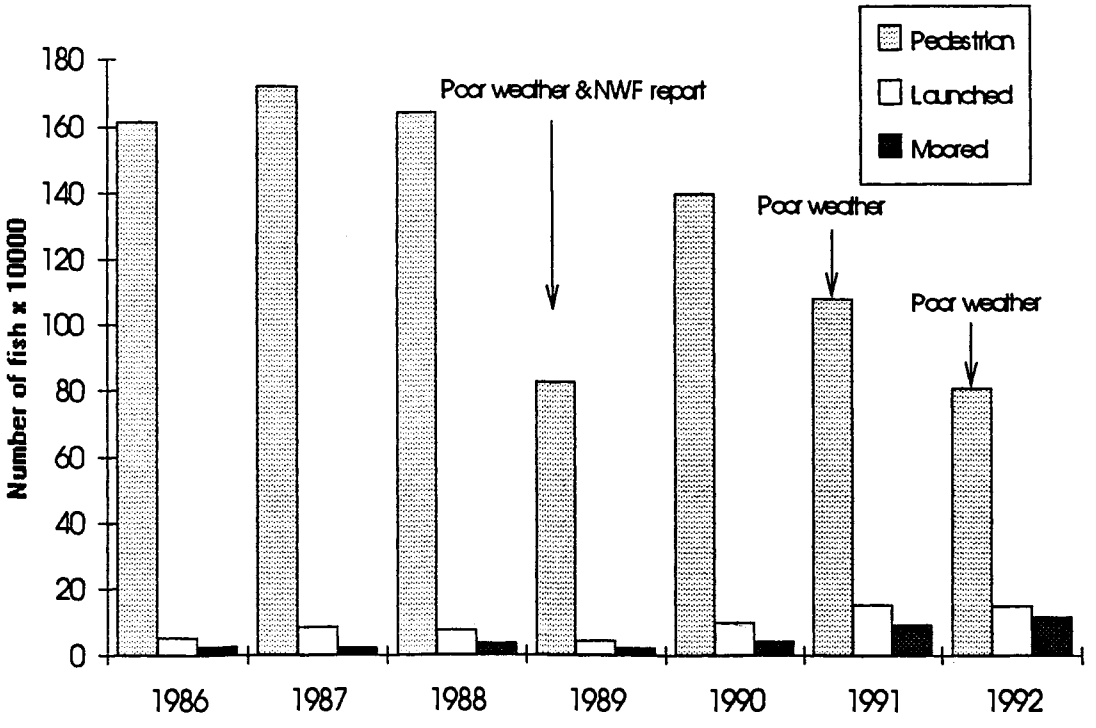


Figure 8. Total non-charter coho salmon sport catch 1986-1992

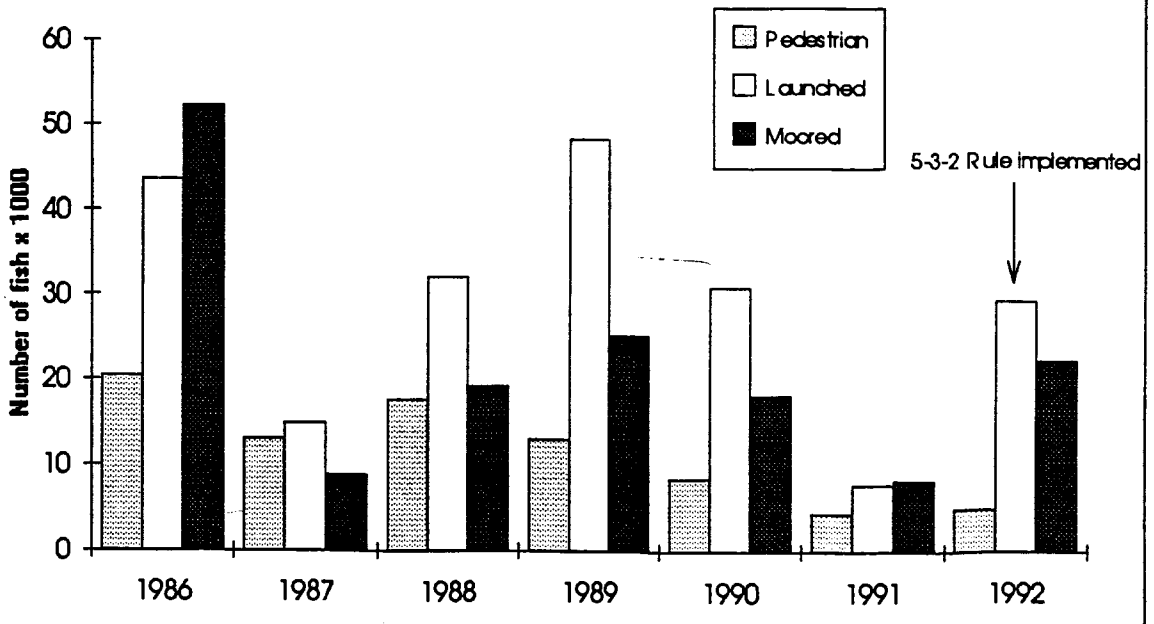


Figure 9. Total non-charter chinook salmon sport catch 1986-1992

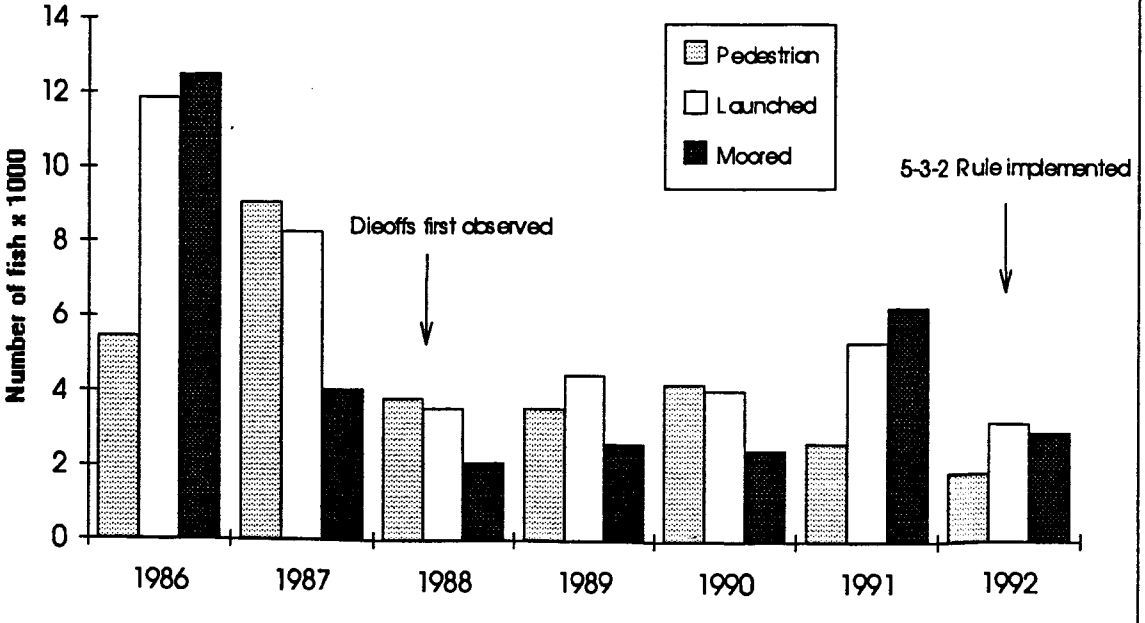
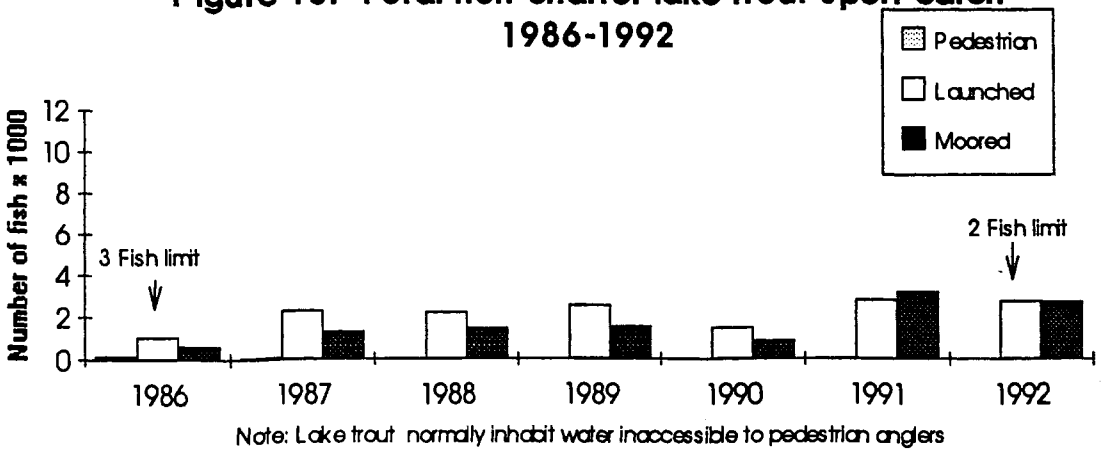


Figure 10. Total non-charter lake trout sport catch 1986-1992



Note: Lake trout normally inhabit water inaccessible to pedestrian anglers

Figure 11. Total non-charter rainbow trout sport catch 1986-1992

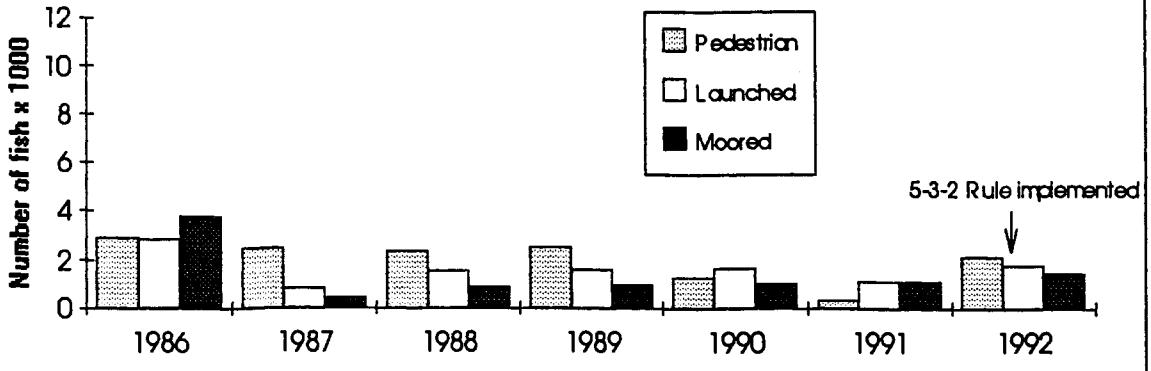


Figure 12. Total non-charter brown trout sport catch 1986-1992

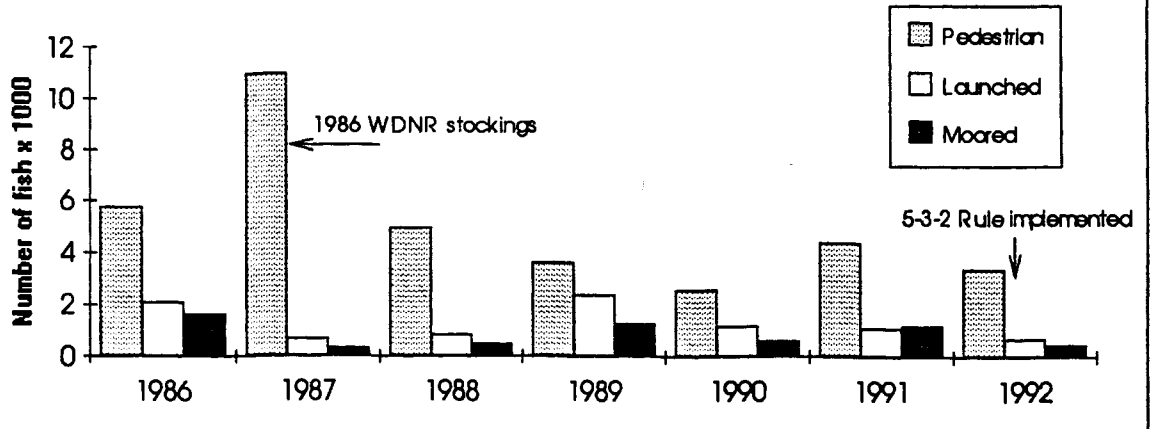


Figure 13 (a). Available lake wide stocked coho salmon 1986-1992, omitting natural mortality

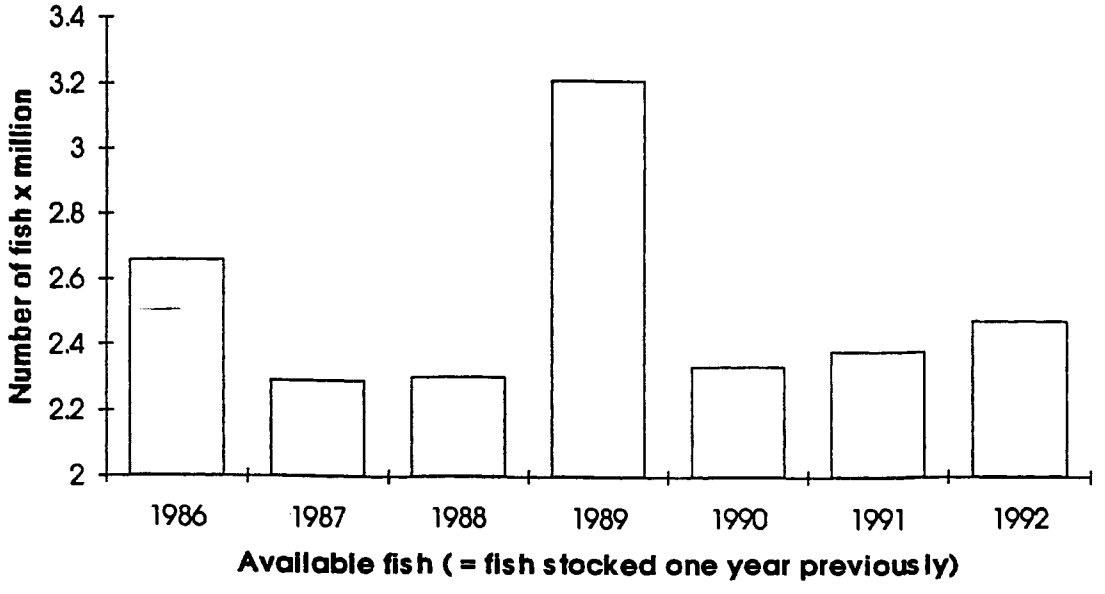


Figure 13 (b). Total non-charter sport catch of coho salmon 1986-1992

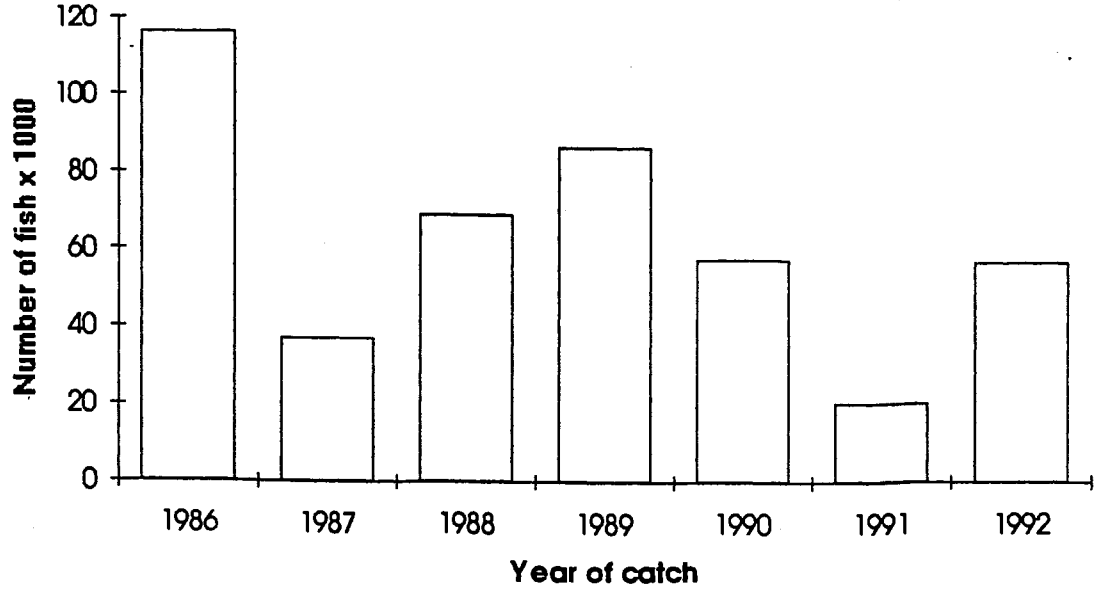


Figure 14 (a). Lake wide stocked chinook salmon available 1986-1992, omitting natural mortality

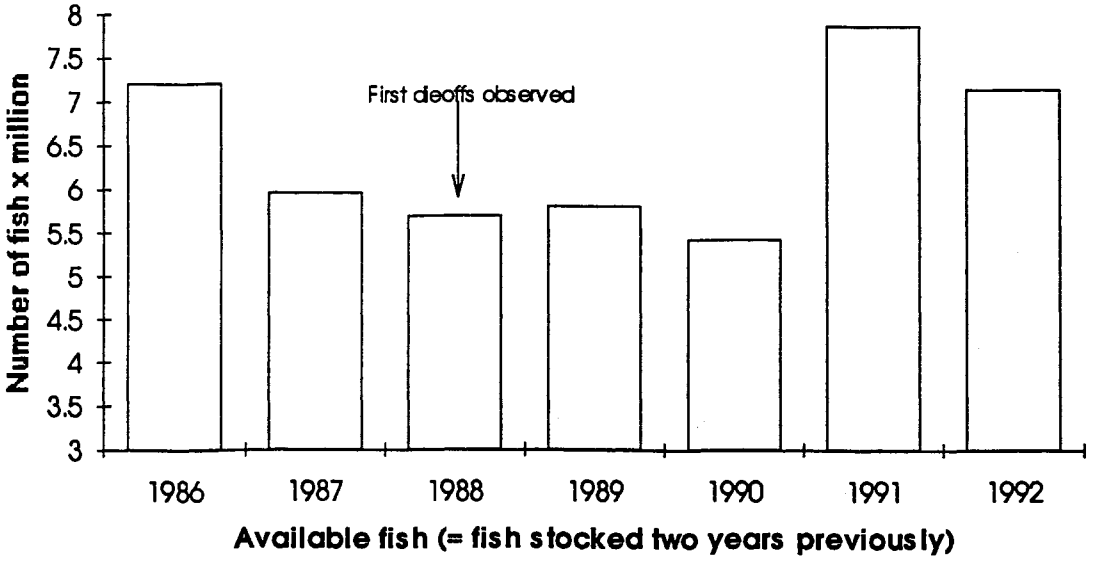


Figure 14 (b). Total non-charter sport catch of chinook salmon 1986-1992

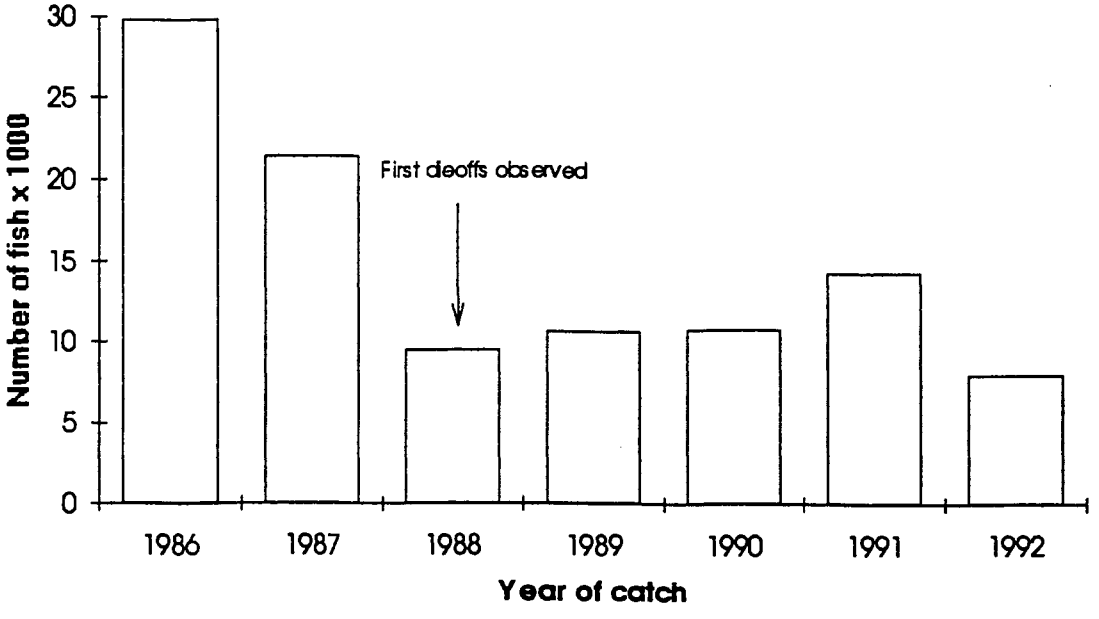


Figure 15. Average lengths of creeled coho and chinook salmon 1986-1992

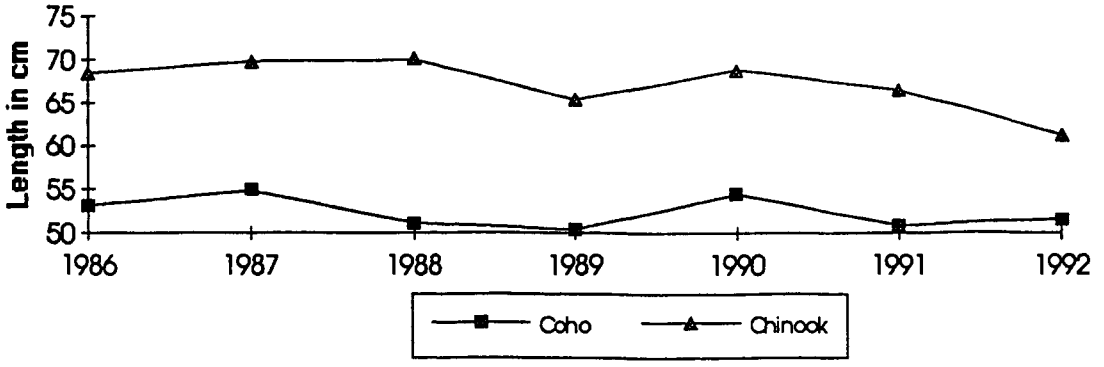


Figure 16. Average lengths of creeled rainbow, brown and lake trout 1986-1992

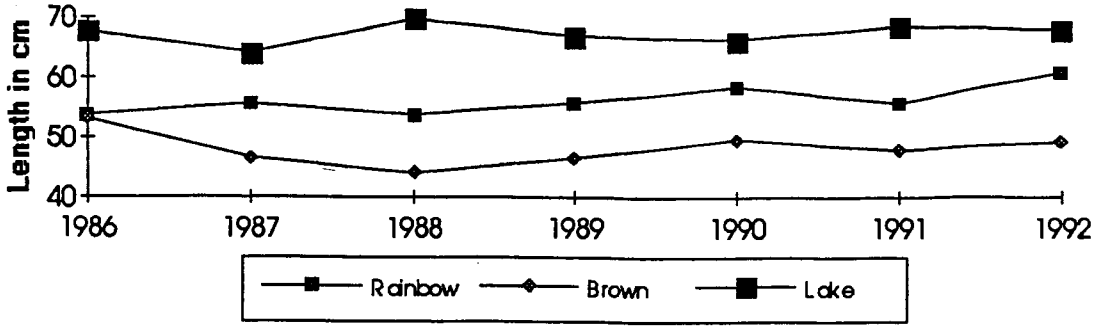
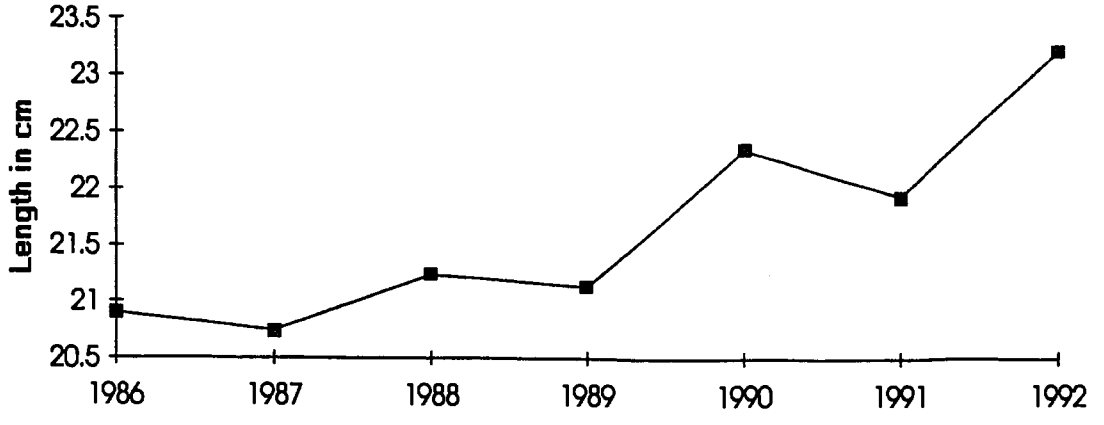


Figure 17. Average lengths of creeled yellow perch 1986-1992



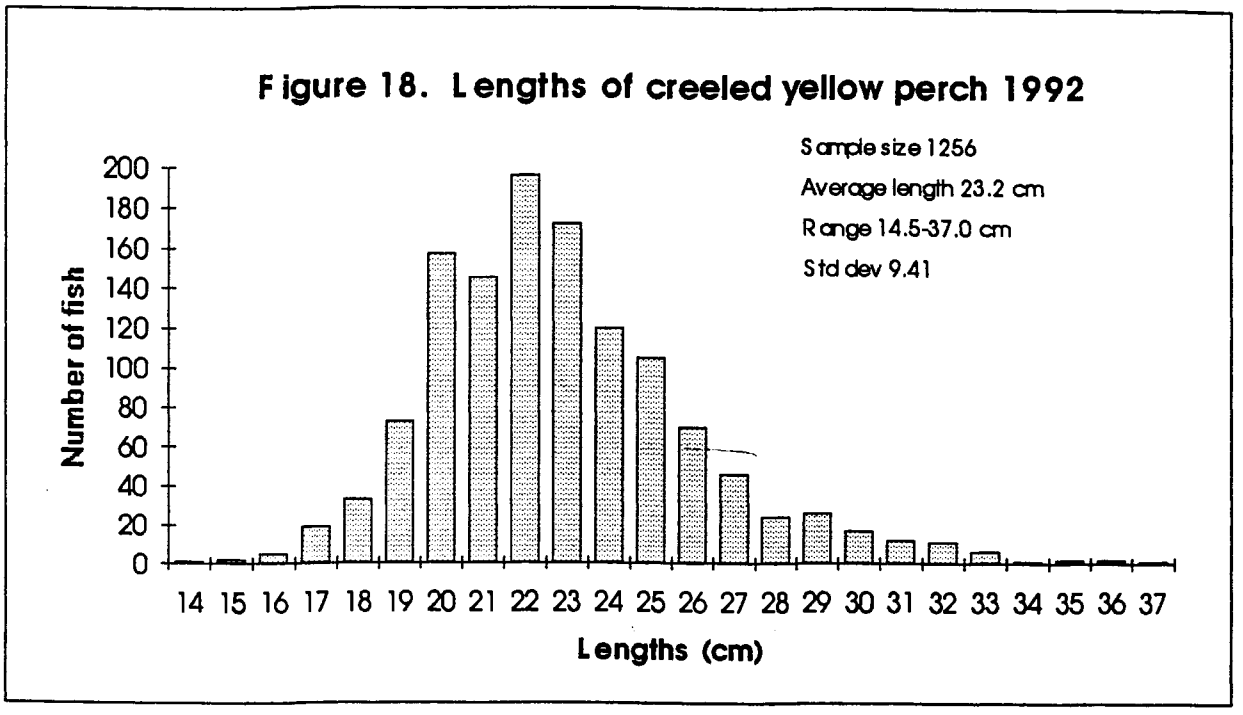


Figure 18. Lengths of creeled yellow perch 1992
Sample size 1256
Average length 23.2 cm
Range 14.5-37.0 cm
Std dev 9.41
Number of fish
200
180
160
140
120
100
80
60
40
20
0
14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37
Lengths (cm)

Figure 19.(a) Length of creeled coho salmon in spring of 1992

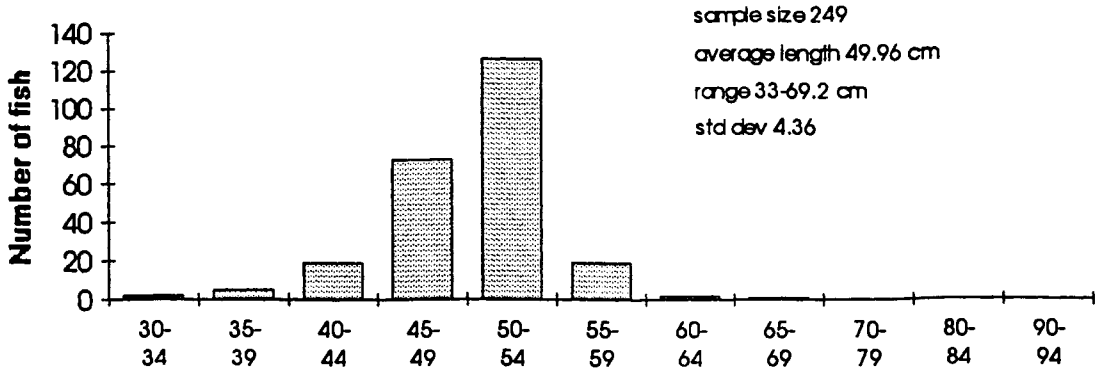


Figure 19 (b). Length of creeled coho salmon in summer of 1992

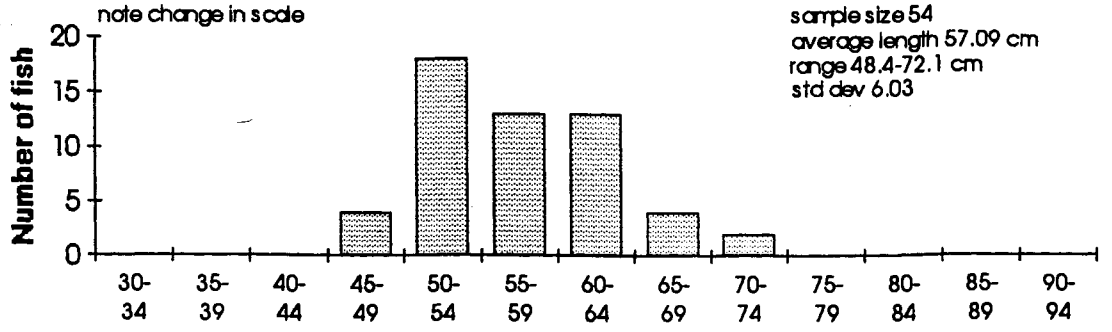


Figure 19 (c). Length of creeled coho salmon in fall of 1992

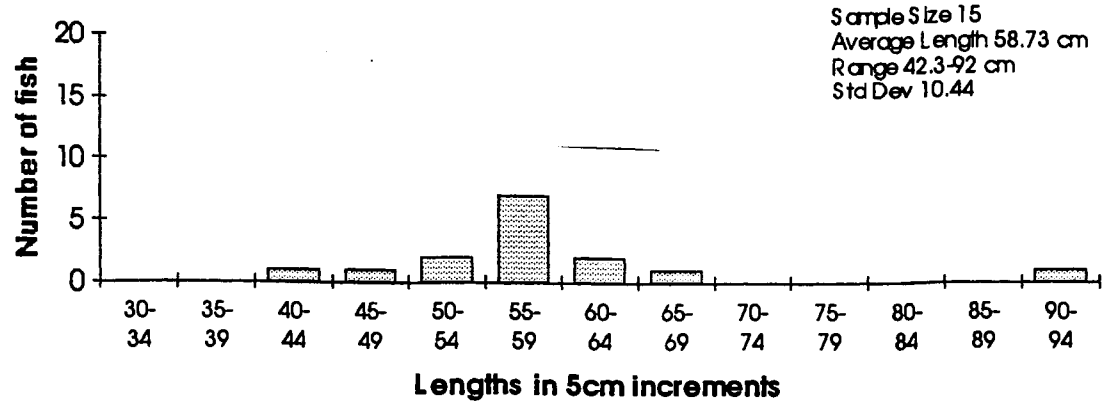


Figure 20(a). Length of creeled chinook salmon in summer of 1992

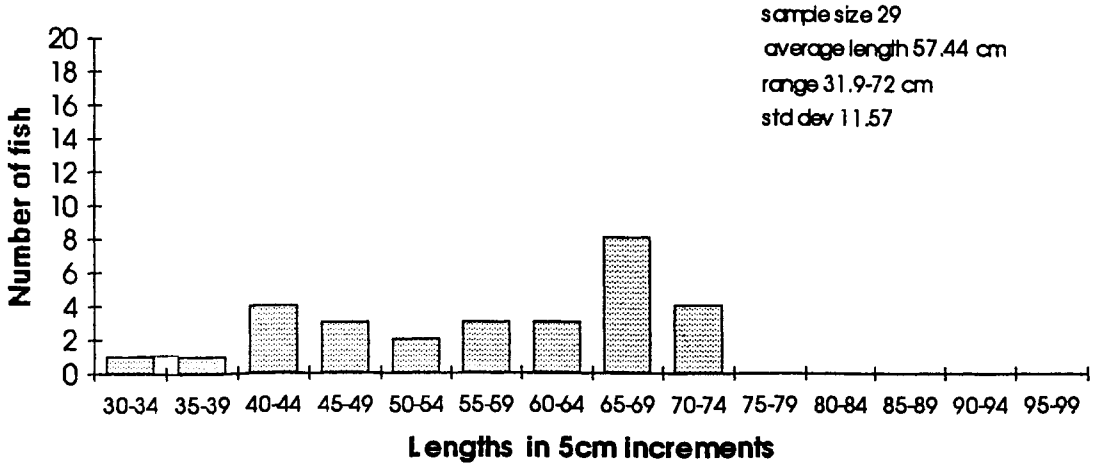


Figure 20 (b). Lengths of creeled chinook salmon, fall 1992

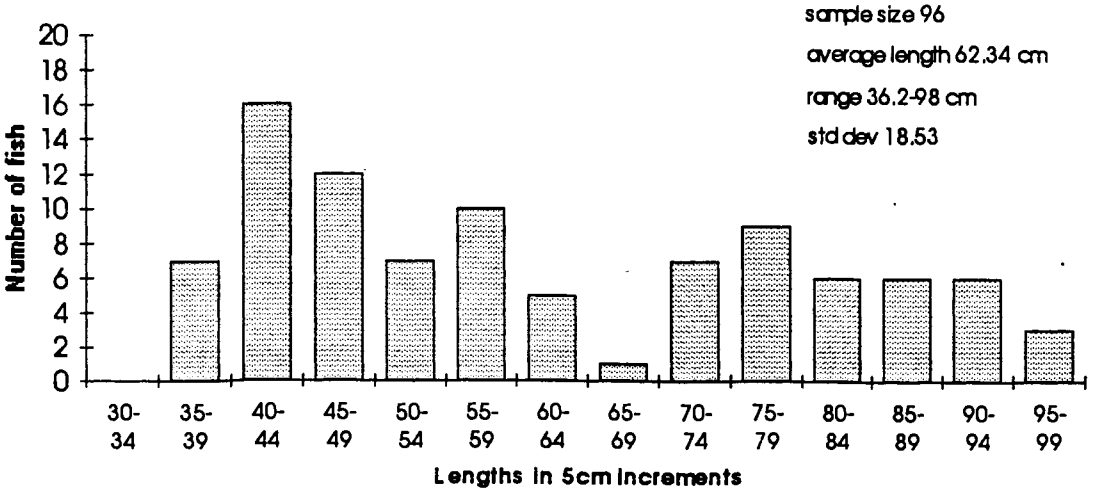


Figure 21. Lengths of creeled brown trout 1992

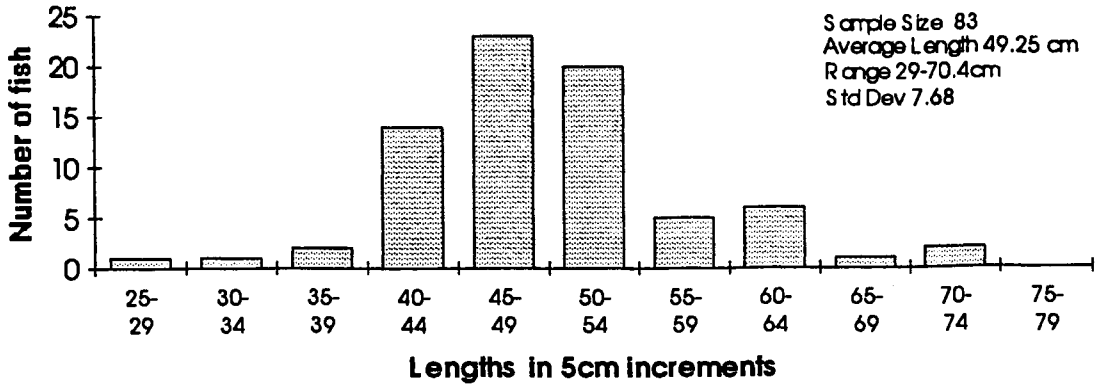


Figure 22. Lengths of creeled lake trout 1992

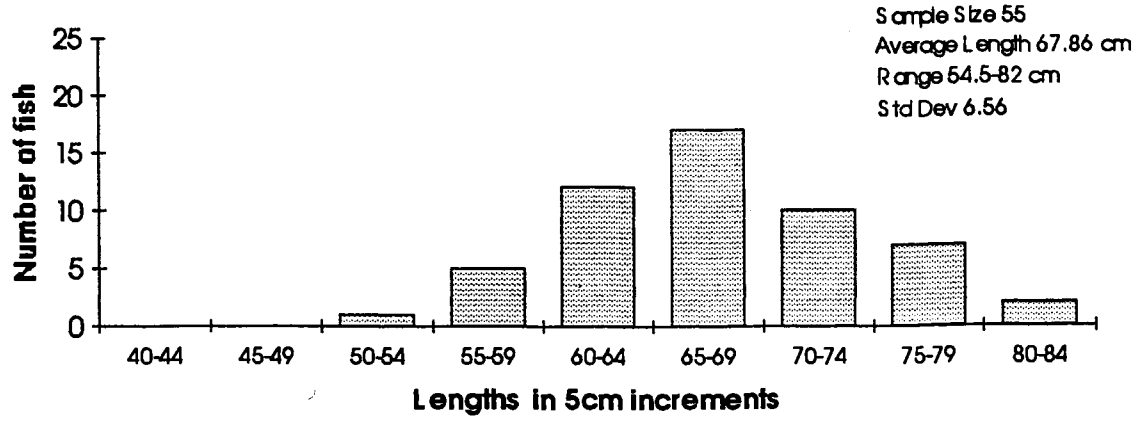
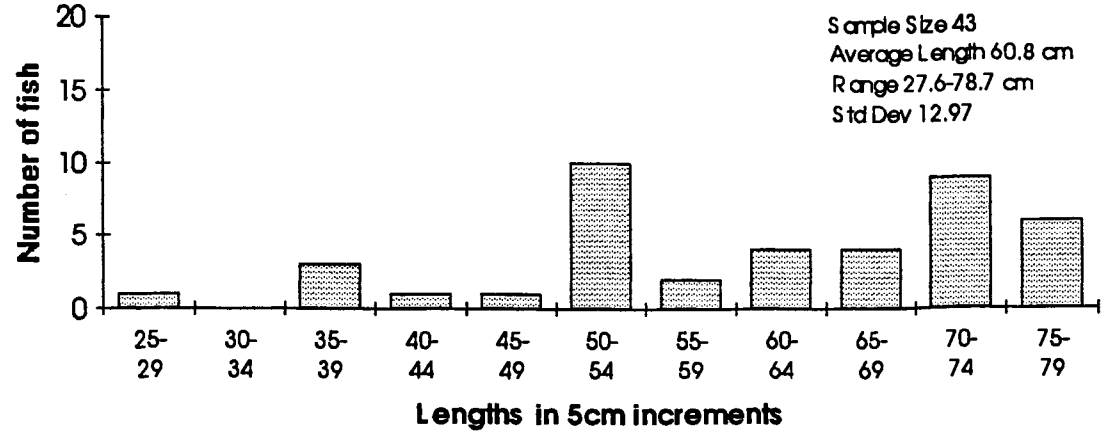


Figure 23. Lengths of creeled rainbow trout 1992



APPENDIX A - DATA FORM AND INSTRUCTIONS TO CLERKS

We record data on the Interview Form and a modified version of the same. The modified version is sometimes used by a helper in connection with interviews of boaters (see "Instructions to Clerks -- Work Assignments").

One important general rule applies to both forms: "Fill in all the blanks". If you don't know a particular value, draw a diagonal slash through that space on the form. The only exception to this rule is the "numbers in possession" section of the Interview Form. In that section, blanks are interpreted as zeros.

Interviews are obtained in sets. For each set, you visit a site and interview a number of angling parties. Each interview involves data for an entire angling party, although you might only speak with one individual angler. The interviews are taken from pedestrian anglers or from boaters returning to a launch ramp.

When pedestrian anglers are being interviewed, interview either all present or all that can be interviewed in the assigned period (usually two hours). Counts of pedestrian anglers are made at the start and finish of the interview set. When all pedestrian fishing parties cannot be interviewed, interview a representative sample of the anglers present. Thus, if the site includes harbor, shore, and structure areas (see maps), you interview parties from all three areas in proportion to their numbers. Approach all types of people (men, women, Chinese, hispanic, white, polite, surly, etc.) without special favor for or against any. To assure impartiality skip a fixed number of anglers between interviews, with the number to skip determined so that the entire site is covered during the interview period. If you encounter an angling party that has already been interviewed in our creel survey that day, skip them.

When counting anglers, ignore spectators (casual passers-by) but include members of the angling party who are not fishing at the moment. This can include family members (spouses and children over five years old) who are accompanying the angler.

When boaters are interviewed, stay at the ramp for a predetermined time (usually two hours) and record data for all returning boats. Sometimes it is not possible to interview all angling boats. When that happens, you will interview a representative sample of boats containing anglers. When a boat is not interviewed, you record an ID number (see below), the time (under "interview time"), and one of four notes (in the right-hand margin): "ANI" (anglers - no interview), "PNA" (power - no anglers), "SAIL" (sail boat), and "CH" (charter fishing boat). Counts of trailers are made at the start and finish of the interview period. It is important that the counts indicate the number of trailers at the times when you start and finish your interview set. Sail boats, non-angling power boats, and charter boats are never interviewed.

Record the total number of trailers of all types, but only count empty trailers (those without boats on them) with cars attached. Only count trailers at the east ramp area when covering Burnham Harbor.

The interview form has four areas for recording data: 1) Site Data, 2) Party Record, 3) Catch Record, and 4) Fish Record.

1) Site Data. This area is a condensed version of the Instantaneous Counts Form. Counts are recorded at the start and finish of each interview set. Remember the rule: "Fill in all the blanks". When conducting boat interviews, record slashes in the pedestrian spaces. When conducting pedestrian interviews of any kind, enter a slash in the trailers space. When conducting pedestrian interviews with "regular peds", always enter slashes for all three types of "special peds", and vice-versa.

2) Party Record and **3) Catch Record.** These areas are filled-in during the interviews. Column headings are explained here:

ID - Interviews (and non-interviewed boats) are sequentially numbered. For pedestrians, assign a number to each pedestrian party interviewed. For boaters, assign a number to each boat that returns to the ramp, including those that are not interviewed. Each clerk assigns one series of numbers each day, with no repeats. Thus, for example,

when you conduct more than one interview set in a day, do not begin the second set with number 1; continue numbering where you left off in numbering the previous set. Also, for interview sessions at boat ramps, record the registration number of each boat.

angler type - One of eight mutually exclusive possibilities is circled: har (harbor), sho (shore), str (structure), lau (launched), sna (snagger), smt (smelter), ice (ice-angler), and moo (moored).

 # angs - For each party record the total number of anglers (tot) and the number who are Illinois residents (res). Remember, as in the Instantaneous Counts Form, include members of the angling party who are not fishing at the moment.

 # lines - For each party record the number of fishing rods (rod) and the number of power lines (pwr) in use by that party. Trolley lines are counted as power lines here.

 # nets - (ignore)

trip times - Record three times: the time the fishing trip started, the time of the interview, and the time the trip ended (or is expected to end). Always record times in 24-hour time (e.g., two o'clock p.m. is 1400). When the fishing trip has started the previous day, still record the time of day that fishing started. Fishing trips by pedestrians are considered to start when the angling party arrives at the shoreline. Fishing trips using boats are considered to start when the boat leaves the ramp and to end when the boat arrives back at the ramp.

expenses - Data are only recorded for boaters, not pedestrian anglers. Remember, the data you record applies to the entire party being interviewed. You record only costs of items acquired since the last fishing trip on Lake Michigan. If this is the first trip that an angler has ever made to Lake Michigan, include the total purchase price of all items in each category, regardless of when purchased. Notice that we are not concerned with when the item was paid for, only with when it was acquired and what it cost. 1) For major expenses (maj), record the purchase price of boat, motor, and/or trailer, if acquired since the last fishing trip on Lake Michigan. Include newly purchased used equipment. 2) For minor expenses (min) and other expenses (other) record no data.

sought - Record species sought as p (perch), s (salmonid), ps ("whatever bites"), or o (other specific target species).

numbers in possession - Record only the numbers of fish in possession of the angling party. Fish names are abbreviated as follows: BK - brook trout, BN - brown trout, RB - rainbow trout, LT - lake trout, CO - coho salmon, CH - chinook salmon, YP - yellow perch, SM - smallmouth bass, WP - white perch. Accurate identification is extremely important; don't hesitate to use your key if you have any doubt about the identification of any fish. If the fish in possession of an angling party include some caught at any other site, exclude those from the numbers recorded here.

(no heading) - Ask the angler how many floy tags he/she has seen on perch presently in possession. Record that number here.

4) Fish Record. Here you record physical measurements made in connection with the interviews. Above this section you record the time your interview set was scheduled to start (usually 0600, 0830, or 1100). You should be able to weigh, measure, and examine for clips (for purposes of this form, we count floy tags under the heading "clips"), scars, and wounds on all salmonids that you encounter in possession of anglers. When an angler has more than 5 yellow perch, select five fish at random from the catch to weigh, measure, and examine for floy tags (you don't need to look for clipped fins or lamprey marks on yellow perch). In addition to the five randomly selected perch, record data for any other yellow perch on which the angler has found a floy tag. On some occasions anglers will have removed floy tags from fish before you arrive. If it is not possible to know which specific fish the tag came from, record all information printed on the tag in the margin of the form and keep the tag. Column headings are explained here:

ID - Record the same number recorded in "Party Record" for the angling party that caught this fish.

species - Record the two-letter abbreviation of the species name. The abbreviations are those that appear as headings in the "Catch Record" section.

weight - Record the weight of the fish in grams. Do not record weights of gutted or beheaded fish. Be sure to "zero" the scale and to use the appropriate scale for the size of the fish being weighed.

length - Record total length (distance from tip of snout to tip of tail) in centimeters.

clipped fins - As outlined above you will examine all salmonids for clipped fins and floy tags, and you will examine some yellow perch for floy tags only. You record abbreviations for what you find (for purposes of data recording, assume that perch never have clipped fins or lamprey scars or wounds). The permitted entries are do (dorsal), ad (adipose), lp (left pectoral), rp (right pectoral), lv (left ventral), rv (right ventral), an (anal), fl (floy tag), lm (left maxillary), rm (right maxillary) and none. Also, when you encounter a floy tag, record all the information printed on the tag. Remember, leave no blank spaces on the form; if you are unable to examin the fish, draw diagonal slashes through the spaces.

 # scars and # wounds - This refers to marks left by sea lampreys; we are not interested in scars and wounds from other causes. The distinction is that wounds are still all or partly red, while scars are not. Since yellow perch are not examined for scars and wounds, always draw slashes through these boxes for perch.

PAGE _____ OF _____

REPORTER _____ LOCATION _____

DATE ____ ____ ____
M D Y

SITE DATA	TIME	REGULAR PEDS			SPECIAL PEDS			TRAILERS
		HAR	SHO	STR	SNA	SMT	ICE	
START								
FINISH								

PARTY RECORD															CATCH RECORD											
ID	ANGLER TYPE (CIRCLE ONE)	# ANGS		# LINES		# NETS			TRIP TIMES			EXPENSES ($)			SOUGHT	NUMBERS IN POSSESSION										
		TOT	RES	ROD	PWR	GILL	DIP	SEINE	BEGIN	INTER-VIEW	END	MAJ	MIN	OTHER		BK	BN	RB	LT	CO	CH	YP	SM	NP	OTHER
	HAR SHO STR LAU SNA SMT ICE MOO																								
	HAR SHO STR LAU SNA SMT ICE MOO																								
	STR LAU MOO																								

TIME (start time of interview set): _____

FISH RECORD						
ID	SPECIES	WEIGHT (g)	LENGTH (cm)	CLIPPED FINS	# SCARS	# WOUNDS

Figure 2. Interview form. The Site Data, Party Record, and Catch Record sections of the form are shown to the left. The Fish Record (back side of the form) is shown below.

APPENDIX B - PROJECT F-52-R7 PERFORMANCE REPORT

The foregoing report does not directly discuss progress toward each of the specific objectives listed in the AFA for this project. The purpose of this appendix is to list the jobs defined in that AFA and to comment on progress toward the objectives of those jobs.

Job 1. Interviews

Objective: To gather the necessary information from pedestrian anglers and boaters.
Progress: Completed.

Job 2. Data entry

Objective: To enter data into computer files.
Progress: Completed.

Job 3. Analysis and reporting

Objective: To produce and summarize the desired estimates of fishing effort and harvest.
Progress: Completed.

APPENDIX C - SNAGGING SURVEY

A survey of snagging was conducted from October 1 through November 15, 1992. During that period a creel clerk visited each of the four legal snagging areas (Waukegan Harbor, Winnetka Power Plant discharge area, Diversey Harbor, and Jackson Park) on 14 days (seven weekend days and seven week days). Up to 10 snaggers were interviewed on each occasion using methods described above. The only difference in methods between this survey and the main summer survey of pedestrian anglers was that the time of day of the interviews was not specified in advance. Instead the creel clerk simply visited all sites on the randomly selected days, with the time of arrival at each location left to his/her discretion. Results of the survey of snagging are summarized in Tables 17 and 18.

Table 17. Expenditures by snaggers

Location	Effort (angler-trips)	Expenditures major (boat)	minor (gear)	other (travel)
Waukegan	640	$0	$4,356	$1,855
Winnetka	0	$0	$0	$0
Diversey	1,898	$0	$12,928	$5,505
Jackson	1,025	$0	$6,980	$2,972

Table 18. Catch by snaggers

Location	Effort (angler-hours)	Catch yellow perch	brown trout	rainbow trout	lake trout	coho salmon	chinook salmon
Waukegan	2,757	0	26	0	0	15	53
Winnetka	0	0	0	0	0	0	0
Diversey	8,182	0	0	33	0	139	366
Jackson	4,417	0	0	12	0	0	551